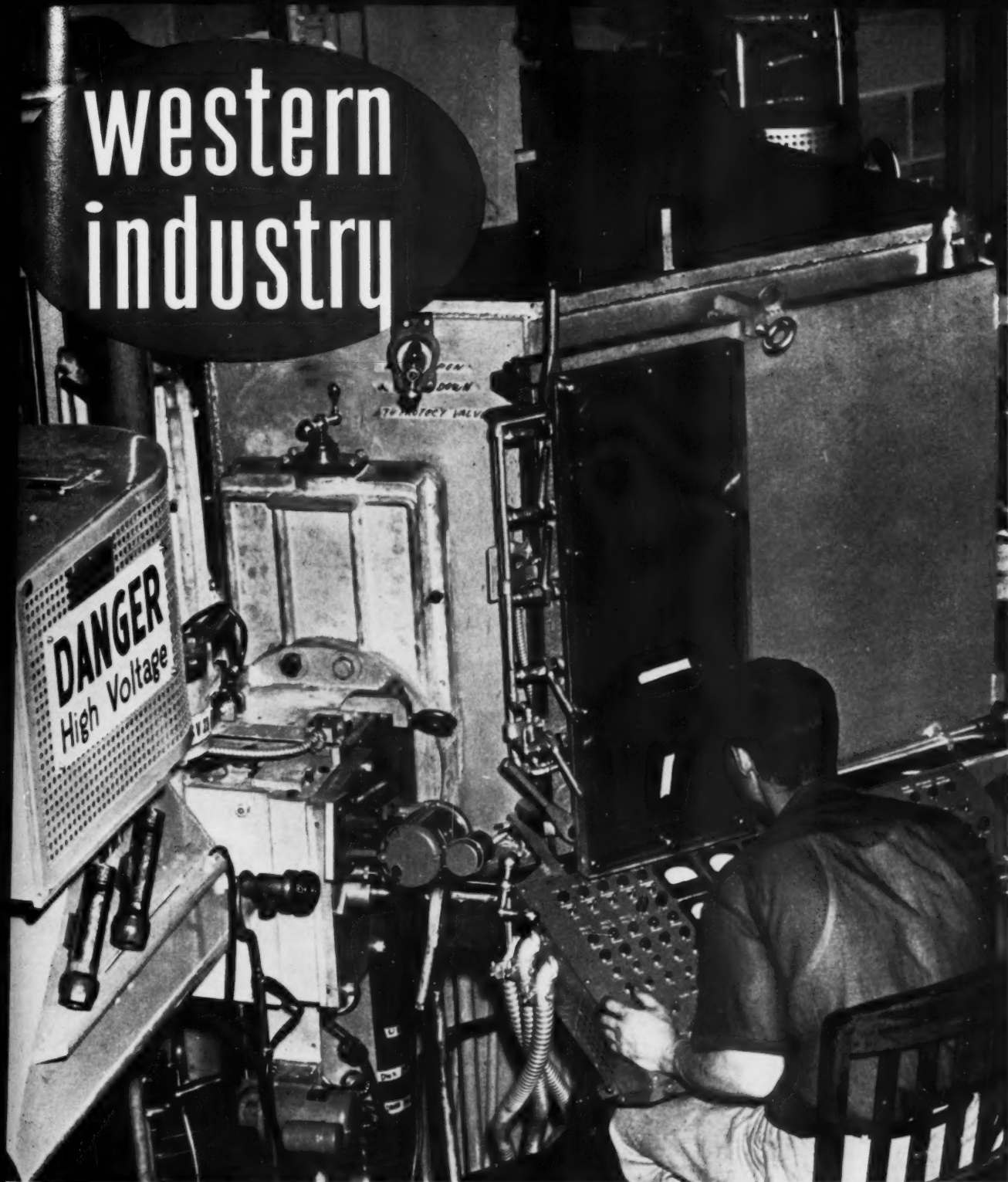


# western industry



Operator controls electron beam vacuum melting furnace. See page 25.

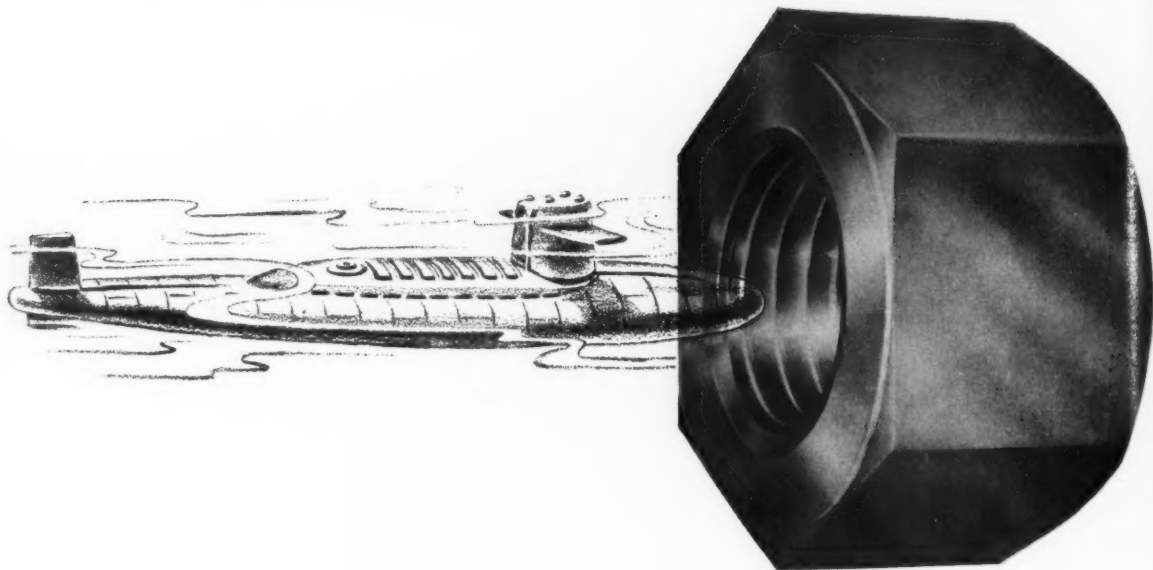
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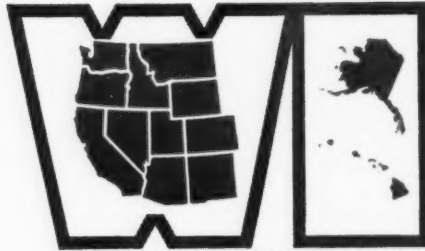
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MARCH-1961  
Vol. 26 No. 3

western  
industry



SERVES THE THIRTEEN WESTERN STATES

<b>SPECIAL REPORT (cover story)</b>	<b>25</b>	<i>Metals and metalworking</i>
	<b>30</b>	<i>Western metal congress and exposition</i>
	<b>58</b>	<i>Special manuals on metals and metallurgy</i>
<b>MAINTENANCE</b>	<b>45</b>	<i>Safeguards against abrasive plastics</i>
<b>PLANT EXPANSION</b>	<b>48</b>	<i>Field warehousing, a tool for western industrial expansion</i>
<b>PACKAGING</b>	<b>50</b>	<i>Straps and buckles have industrial handling uses</i>
<b>PRODUCTION</b>	<b>51</b>	<i>Do it yourself computer service</i>
<b>METALWORKING</b>	<b>52</b>	<i>Rapid replacement of machine tools</i>
<b>MANAGEMENT</b>	<b>54</b>	<i>Western states industrial distributors conference</i>

**COVER PHOTO**

**OPERATOR OF ELECTRON BEAM** vacuum melting furnace at Temescal Metallurgical Corp., Berkeley, Calif., views melting through window. From panel he can observe lowering of columbium ingot being melted, retraction of newly made lower ingot and melting speed of electron beam. For story see *Metals & Metalworking Report*, page 25.

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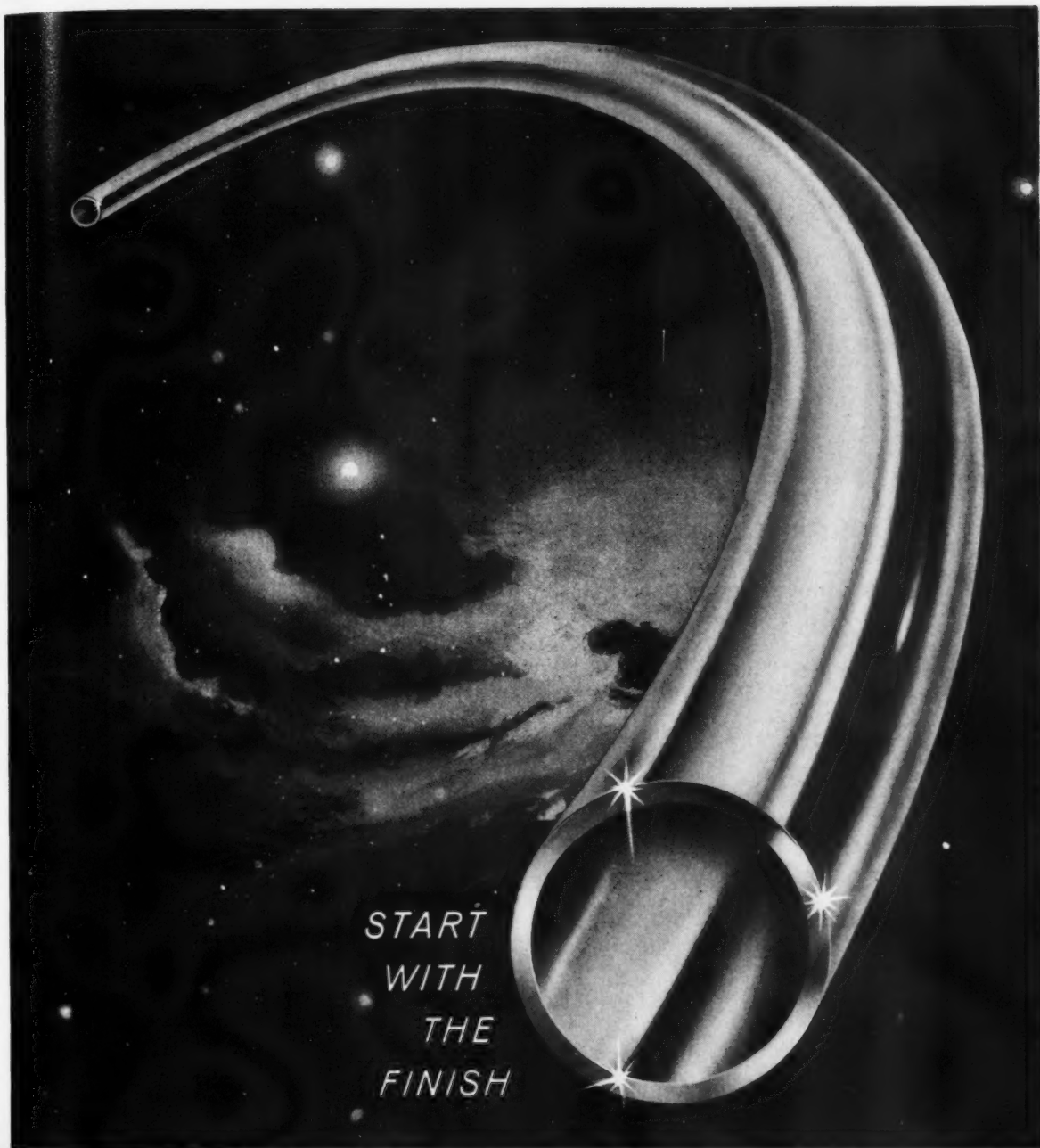
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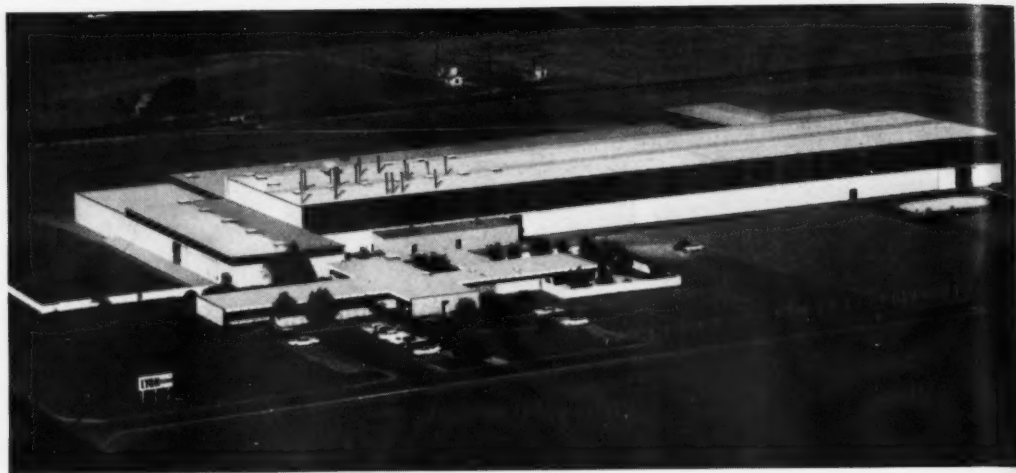
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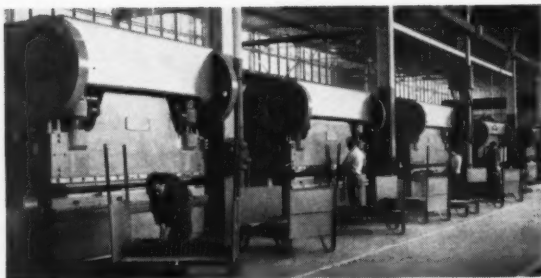
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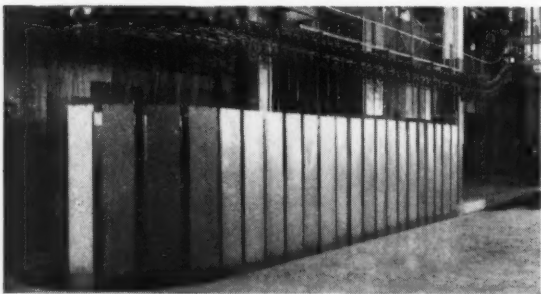
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Above—portion of a line of presses—typical of the batteries of modern machines for steel fabrication.



Above—a portion of the modern electrostatic finishing line showing steel panels being conveyed to ovens for lifetime, baked-on finish.

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WESTERN INDUSTRY/MARCH 1961



western  
industry

# western meetings

## Aircraft Electrical Society Meeting



**BOULDER DAM POWER AT MACH 3 SPEEDS**, that is the way B. F. Varney (second from left), North American Aviation, Inc., described the electrical system on the B-70 Valkyrie bomber. More than 500 members of the Aircraft Electrical Society were briefed by Varney and Col. Richard Evans, manager of North American's Los Angeles Division B-70 Air Force and government liaison (second from right) at the group's Feb. 8 meeting at the Institute of Aerospace Sciences Auditorium, Los Angeles. Carlyle Smith, AES president (right) and John Christie, vice president (left) learn that the XB-70, first of an order for 12, will take the air by spring 1962.

## Western Plant Maintenance Show Prepares for July Opening

NEW CONCEPTIONS of maintaining industrial plants looking toward the new problems created by nuclear and other super-scientific developments will be explored at the Western Plant Maintenance and Engineering Show & Conference scheduled for July 18-20 at Los Angeles' Pan Pacific Auditorium, according to R. L. Saling, regional manager of maintenance products Westinghouse Electric Corporation, who is the chairman of the Board of Sponsors.

Meetings of industrial leaders are scheduled within the next 30 days in both northern and southern California to analyze the most important new developments in plant engineering and maintenance which will be incorporated in the Los Angeles show.

The series of conferences to be held concurrent with the show will be under the leadership of L. C. Morrow, internationally famous director of the National Plant Maintenance and Engineering Conferences.

Saling said that since 1957 when the last Western Plant Maintenance and Engineering Show was held, there has been tremendous increase in new industries in the West, now standing on the threshold of an industrial era which will lift parts of Western industry to a position of national leadership.

## Denver is Site of MHEDA Meeting

THE 1961 MHEDA National Convention will be held at the Denver-Hilton Hotel, Denver, Colorado, on June 1, 2, 3. Theme of the Convention is "Better Methods For Profit."

There will be such able speakers as the Honorable Calvin D. Johnson, Special Consultant on Public Affairs of the American Trucking Association; H. Merrill Bowman, Vice President, T. B. Wood's Sons Company, a manufacturer who strongly endorses Distributor business association activity; Leonard M. Wasserbly of Industrial Distributor News, an expert on the business problems of industrial Distributors; Robert F. "Bob" Moody, President, Material Handling Institute, Vice President of Hyster Corp.

The registration fee for the convention will include badge of admittance for all meetings, panel discussions and seminars—two luncheons, cocktail party, banquet, entertainment, and dancing.

Advance registration forms have been sent to all MHEDA members. Nonmembers may register for the convention in advance by notifying: MHEDA, 1028 Connecticut Avenue, Washington, D. C. The nonmember registration fee will be \$60.00, of which \$15.00 may be credited as payment toward a new one year membership in MHEDA.

There will be a dramatic presentation of how the local group can up-grade business practices in your trading area. The local group can bring the market for material handling equipment into clear focus for all distributor members to understand and exploit for profit.

## Los Angeles Chapter ASM Hears Air Pollution Talk

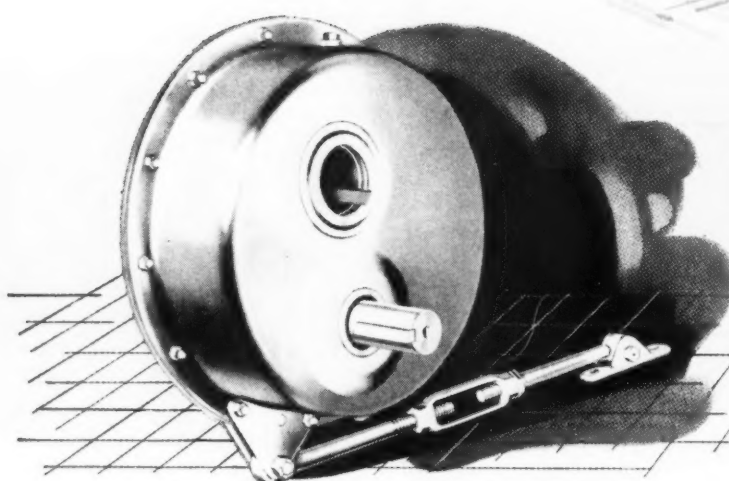
**SPEAKING BEFORE A MONTHLY DINNER** meeting of the Los Angeles Chapter ASM, R. E. Sutherland, senior vice president, Universal Oil Products Co., presented an analysis of current industry efforts to produce an anti-smog device for the automobile, considered the prime cause of Southern California air pollution.



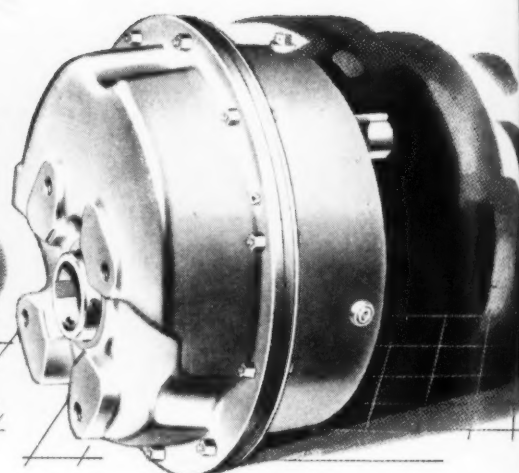
**R. E. SUTHERLAND**, vice president, Universal Oil Products Co. discussed auto anti-smog device at recent ASM meeting in L.A.

Of particular interest to the metalworking field was Sutherland's discussion of the catalytic type converter to oxidize hydrocarbon emissions and carbon monoxide in auto exhaust. Since this device operates at a relatively low temperature it permits use of a minimum of expensive heat resistant alloys, Sutherland said.

Sutherland's firm has developed a catalytic device that soon will undergo evaluation by the state. The catalyst, Sutherland says, will react at normal exhaust temperatures and eliminates need for starting mechanisms such as glow



Ask for Bulletin 7100



Ask for Bulletin 7100

UNIT SIZE	SHAFT MOUNTED DRIVES					
	RATIOS			MOTOR MOUNT	OVERLOAD RELEASE	BACK- STOP
	4	14	24*			
107J	X	X	X	X	X	X
115J	X	X	X	X	X	X
203J	X	X	X	X	X	X
207J	X	X	X	X	X	X
215J	X	X	X	X	X	X
307J	X	X	X	X	X	X
315J	X	X	X	X	X	X
407J		X	X	X	X	X
415J		X	X	X	X	X
507J		X	X	X	X	X

UNIT SIZE	FLANGE MOUNTED DRIVES					
	RATIOS				BACK- STOP	MOTOR MOUNT
	4	9	14	24*		
107J	X	X	X	X	X	X
115J	X	X	X	X	X	X
203J	X	X	X	X	X	X
207J	X	X	X	X	X	X
215J	X	X	X	X	X	X
307J	X	X	X	X	X	X
315J	X		X	X	X	X
407J			X	X	X	X
415J			X	X	X	X
507J			X	X	X	X

½ to 125 hp. Up to 100,000 lb-in. torque

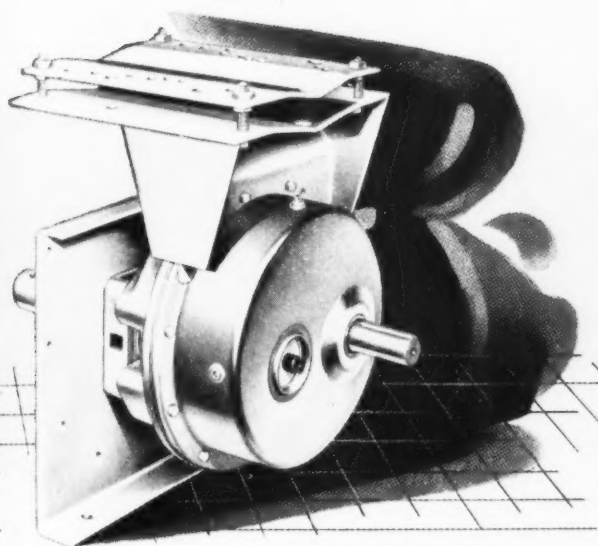
\*20:1 ratio for sizes 107 and 115

½ to 125 hp. Up to 100,000 lb-in.

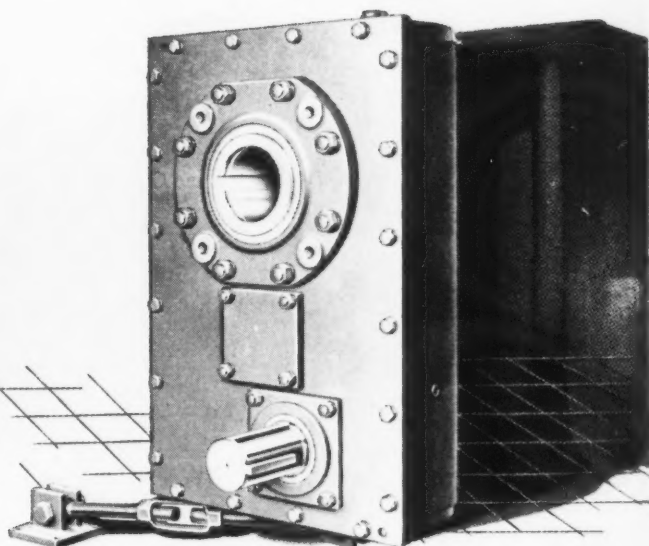
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UNIT SIZE	SCREW CONVEYOR DRIVES				MOTOR MOUNT
	RATIOS				
	4	9	14	24*	
107J	X	X	X	X	X
115J	X	X	X	X	X
203J	X	X	X	X	X
207J	X	X	X	X	X
215J	X	X	X	X	X
307J	X	X	X	X	X
315J	X		X	X	X
407J			X	X	X
415J					
507J					

1/2 to 40 hp. Up to 44,000 lb-in. torque

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## OIL TEMPERED WIRE FINISH

Black Satin—a unique finish on Round Oil Tempered Wire—is another result of CF&I's never-ending search for better and better steel products. Now made in our South San Francisco Mill for prompt delivery to western customers, this powdery oxide finish is produced by tempering wire under electronically-controlled atmospheric conditions. Black Satin serves as a lubricant in coiling and crimping operations, and offers wire-users these outstanding advantages:

**1** Black Satin finish will not "flake off" in surface scales—a problem with ordinary Oil Tempered Wire finishes that require constant adjustment of the initial setup and result in costly machine downtime. And, Black Satin is highly uniform from one end of the coil to the other, from coil to coil and from lot to lot. Because your equipment does not have to be altered to cope with varying physical properties of the wire, you minimize initial setup time... increase your output per shift... reduce scrap losses on long runs... and receive uniform end products. "Stop-and-go" operations are almost nil when new coils are started.

**2** Black Satin lengthens your production runs, because CF&I can supply you with this top quality Oil Tempered Wire in continuous unwelded lengths up to 600 pounds in weight. These large coils minimize the rethreading time required by smaller coils. Black Satin is available in a full range of gages and sizes and in coils from 16" to 72" in diameter. Straightened and cut lengths from 6" to 24' (or longer) can also be supplied.

**3** Black Satin is color-tagged for ease in handling. To assure uniformity of quality from coil to coil, CF&I color-tags every coil of Black Satin for a reliable record of its processing, testing and intended use. To reorder your particular type of Black Satin, you merely return the appropriate tag to us. This tagging system simplifies your inventory control, in-plant storage and materials handling. These tags, three of which are illustrated here, show:

Heat Number \_\_\_\_\_  
Tensile Strength \_\_\_\_\_  
Date \_\_\_\_\_  
Coil Number \_\_\_\_\_  
Test Sheet Number \_\_\_\_\_



Oil Tempered Wire is only one of the many types of quality specialty wire produced by CF&I. Each is packaged for your production: on returnable "spiders" holding a continuous length of wire weighing from 2000 to 4000 lbs.; on non-returnable "spiders" of 500 to 700 lbs. capacity; in fibre-drum holding up to 600 lbs. of wire; in steel-strapped or wire-tied coils from 200 to 2000 lbs.; and in bare or paper-wrapped coils, or in 500- to 800-lb. reels.

This outstanding diversity of product and packaging is another reason why it pays to make CF&I your source of supply for all types of wire. Contact your nearest CF&I representative for complete details.



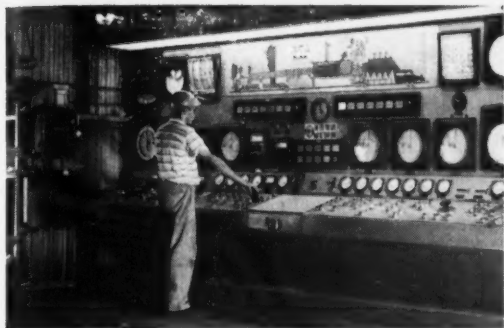
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WESTERN INDUSTRY/MARCH 1961





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WAYTROLS, working individually or in multiple, weighfeed materials at a constant, predetermined rate. Controls are from a

central station, where proportioning can be varied by the turn of a dial.

Catalog 941 describes WAYTROLS and their many interesting uses. For a copy, write The Jeffrey Manufacturing Co., 920 North Fourth St., Columbus 16, Ohio.



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## MEETINGS

(Continued from page 7)

or spark plugs and additions of fuel. Called the PUR-ZAUST muffler, the device has undergone company road testing and its performance indicates it will perform at a cost of about one-fourth of a cent per mile, Sutherland concluded.

### Truck, Trailer & Equipment Show Slated for San Francisco, June 28



**NORTHERN CALIF.** Committee members meet to discuss plans. Left to right: Richard Cantlay, President, Western Truck Lines; L. F. MacNally, Executive Vice President, California Motor Express Ltd.; Carroll J. Roush, President, Oregon-Nevada-California Fast Freight; Gayne Kinsey, Show Manager; B. R. Johnson, President, Pacific Motor Trucking Co.; Wade Sherrard, Managing Director, California Trucking Associations, Inc.; T. R. Dwyer, President, Delta Lines, Inc.; and R. Stuart Moore, President, Los Angeles-Seattle Motor Express, Inc.

### L.A. Plant Engineer Receives Award



**FRED FRYBERGER**, left, national president of American Institute of Plant Engineers presents Annual Fellow Award, an honorary status conferred upon an engineer of distinction, to **Thomas H. Hardgrove**, North American Aviation Corp.

### IRE Conference Scheduled for Phoenix

ONE HUNDRED AND SEVEN booth spaces have been scheduled for the 1961 Technical Conference of the Seventh Region of the Institute of Radio Engineers, April 26-28.

Dick Ellstrom, chairman of exhibits, has announced completion of floor plans for exhibit areas in the Hotel Westward Ho, the conference site giving close proximity to the technical sessions.

The exhibit hours will be from 1 to 10 p.m. on April 26 and from 9 to 5 p.m. on April 27 and 28.

## Calendar of Western Meetings

**Mar. 20-24—WESTERN METAL EXPOSITION AND CONGRESS.** Pan-Pacific Auditorium, Los Angeles, Calif. American Society for Metals.

**Mar. 23-25—MEETING OF AMERICAN MACHINE TOOL DISTRIBUTORS ASSOCIATION.** Mark Hopkins Hotel, San Francisco. American Machine Tool Distributors Ass'n.

**Mar. 27-29—ABWA SHOW OF 1961.** Riviera Hotel, Las Vegas, Nevada. American Bottled Water Association.

**Mar. 28-30—SEVENTH ELECTRICAL MAINTENANCE CONFERENCE.** University of Southern California, Founders Hall, Los Angeles. Electrical Maintenance Engineers Association of California.

**Mar. 28-30—FILAMENT WINDING CONFERENCE.** Huntington-Sheraton Hotel, Pasadena, Calif. Sponsored by Society of Aerospace Material & Process Engineers.

**Apr. 12-14—NATIONAL MEETING FIBER BOX ASSOCIATION.** Fairmont Hotel, San Francisco, Calif. Fiber Box Association.

**Apr. 20-21—RAILROAD CONFERENCE.** Sir Francis Drake Hotel, San Francisco. Jointly sponsored by American Society of Mechanical Engineers and American Institute of Electrical Engineers.

**Apr. 20-21—18th ANNUAL WESTERN SECTION CONFERENCE, SOCIETY OF THE PLASTICS INDUSTRY, INC.** Hotel del Coronado, Coronado, Calif. Society of the Plastics Industry, Inc.

**Apr. 26-28—TECHNICAL CONFERENCE 7TH REGION IRE.** Hotel Westward Ho, Phoenix, Ariz. Includes both technical sessions and exhibits. Sponsored by Institute of Radio Engineers.

**May 8-12—CASTINGS CONGRESS.** Brooks Hall, San Francisco. American Foundryman's Society.

**May 9-11—WESTERN JOINT COMPUTER CONFERENCE.** Ambassador Hotel, Los Angeles. Sponsored by National Joint Computer Committee formed by Institute of Radio Engineers, American Institute of Electrical Engineers, Association for Computing Machinery.

**June 1-3—MHEDA NATIONAL CONVENTION.** Denver-Hilton Hotel, Denver, Colo. Material Handling Equipment Distributors Association.

**June 11-15—SUMMER ANNUAL MEETING OF ASME.** Statler Hilton Hotel, Los Angeles. American Society of Mechanical Engineers.

**June 28-30—INTERNATIONAL TRUCK, TRAILER & EQUIPMENT SHOW.** Brooks Hall, San Francisco. California Trucking Associations, Inc.

**June 28-30—2nd JOINT AUTOMATIC CONTROL CONFERENCE.** University of Colorado, Boulder, Colorado. Sponsored by ISA, AIChE, AIEE, ASME, IRE.

**July 18-20—WESTERN PLANT MAINTENANCE & ENGINEERING SHOW.** Pan Pacific Auditorium, Los Angeles. Sponsored by Clapp & Poliak, Inc.

**Aug. 22-25—1961 WESTERN ELECTRONIC SHOW & CONVENTION.** Cow Palace, San Francisco. Western Electronic Manufacturers Association.

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*"Since I had my transfusion of Maas TSP, I can lick the toughest cleaning job in town."*

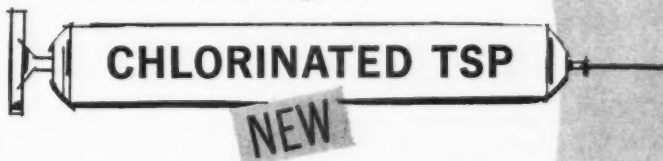


*"I'm prescribing Maas TSP! to beef-up your make-up. You're suffering from acute inert-ingredient-itis and chronic saponifying deficiency."*



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New—Chlorinated TSP—Wherever a deodorant or powerful sanitizer is required, Maas Chlorinated TSP gives an extra plus quality, extra cleaning ability and freer rinsing action.

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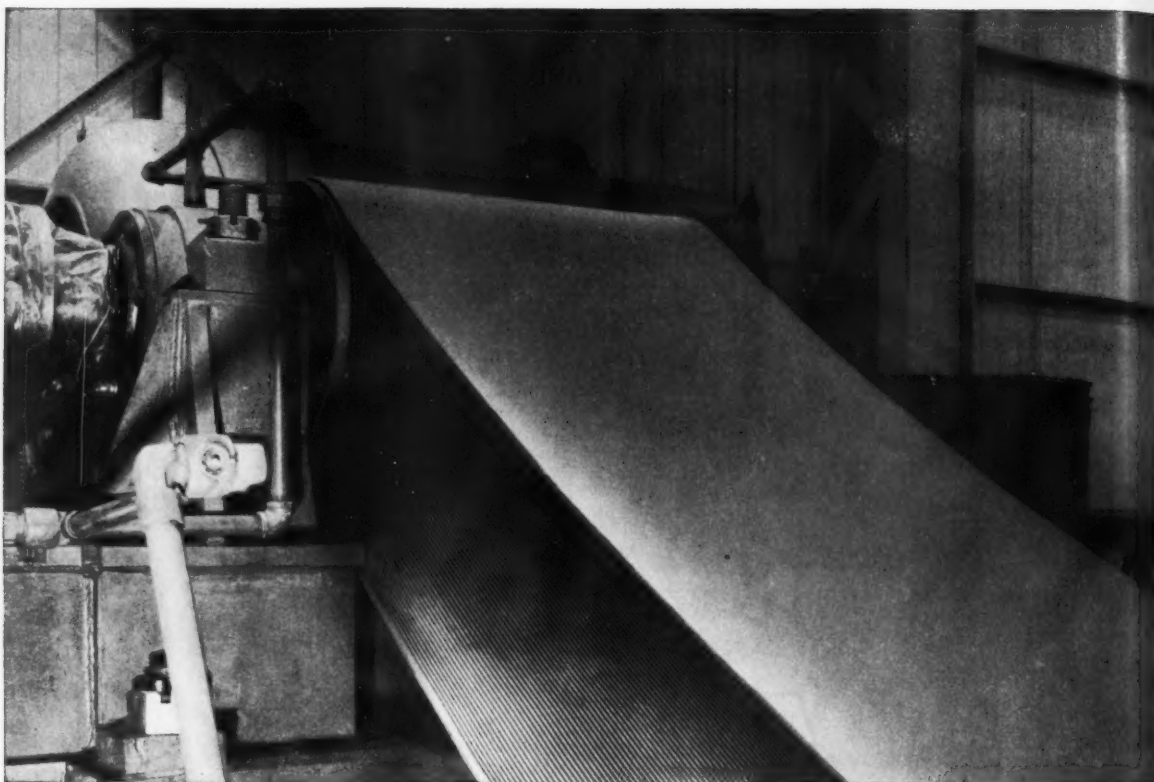
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V-BELTS; shorter, interrupted strength member

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# SAVE 3 WAYS

on production costs



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SPRINGTITES®**

1. Speed up assembly by reducing the number of motions on the production line with Eaton-Reliance Springtites—which are bolts or screws preassembled with spring washers. Scientific light-line studies prove many motions are eliminated by using these fasteners.
2. Keep inventory balanced and make stock handling easier by always having the number of spring washers equal that of the screws or bolts. This also saves on paper work by reducing the number of stock requisitions and orders.
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# **New...from VAN HUFFE**

**COLD FORMED CONTINUOUS**

## **SINGLE WELD**

**STEEL TUBING  
IN RECTANGLES  
AND SQUARES  
IN SIZES THIS**

# **BIG**

**FOR  
INDUSTRIAL AND  
ARCHITECTURAL  
APPLICATIONS**



**WHERE BIG IDEAS TAKE SHAPE IN METAL**

## APPLICATIONS

Because of its high production potential and adaptability, the uses of Van Huffer square and rectangular tubing are practically unlimited. Here are a few:

Structural Columns  
Sign Supports  
Canopy Supports  
Beams  
Steel Buildings  
Farm Equipment  
Earth Moving  
Equipment  
Bridge Work  
Automobile  
Transports  
Storage Racks  
Guard Rails

### ACTUAL SIZE

6" x 6" .259 WALL

## ADVANTAGES

### MORE STRENGTH

Roller Die, cold formed continuous welding on one side *ONLY* provides maximum strength throughout.

### GREATER SAVINGS

High strength-to-weight ratio permits use of lighter gauges or smaller sizes than solid metals.

### UNIFORMITY

Uniform wall thickness, square sides, accurate radii and straightness.

### FUNCTIONAL BEAUTY

Smooth finish, free of scale and protruding flash, ready to paint.

### STANDARD SIZES AND GAUGES

#### Squares:

5" x 5" — .165" to .259 wall

6" x 6" — .165" to .259 wall

#### Rectangles:

4" x 6" — .165" to .259 wall

4" x 8" — .165" to .259 wall

in any lengths and all common grades of steel.

ACTUAL SIZE: 4" x 8" .259 WALL

Van Huffer also produces this wide range of standard welded sizes and gauges:

#### ROUND:

¾" thru 6" in gauges from .020 (25 ga.) thru .259 (3 ga.) and all intermediate sizes.

#### SQUARE:

¾" thru 6" in gauges from .020 (25 ga.) thru .259 (3 ga.) and all intermediate sizes.

#### RECTANGULAR:

¾" x ¾" thru 4" x 8" in gauges from .020 (25 ga.) thru .259 (3 ga.) and all intermediate sizes.

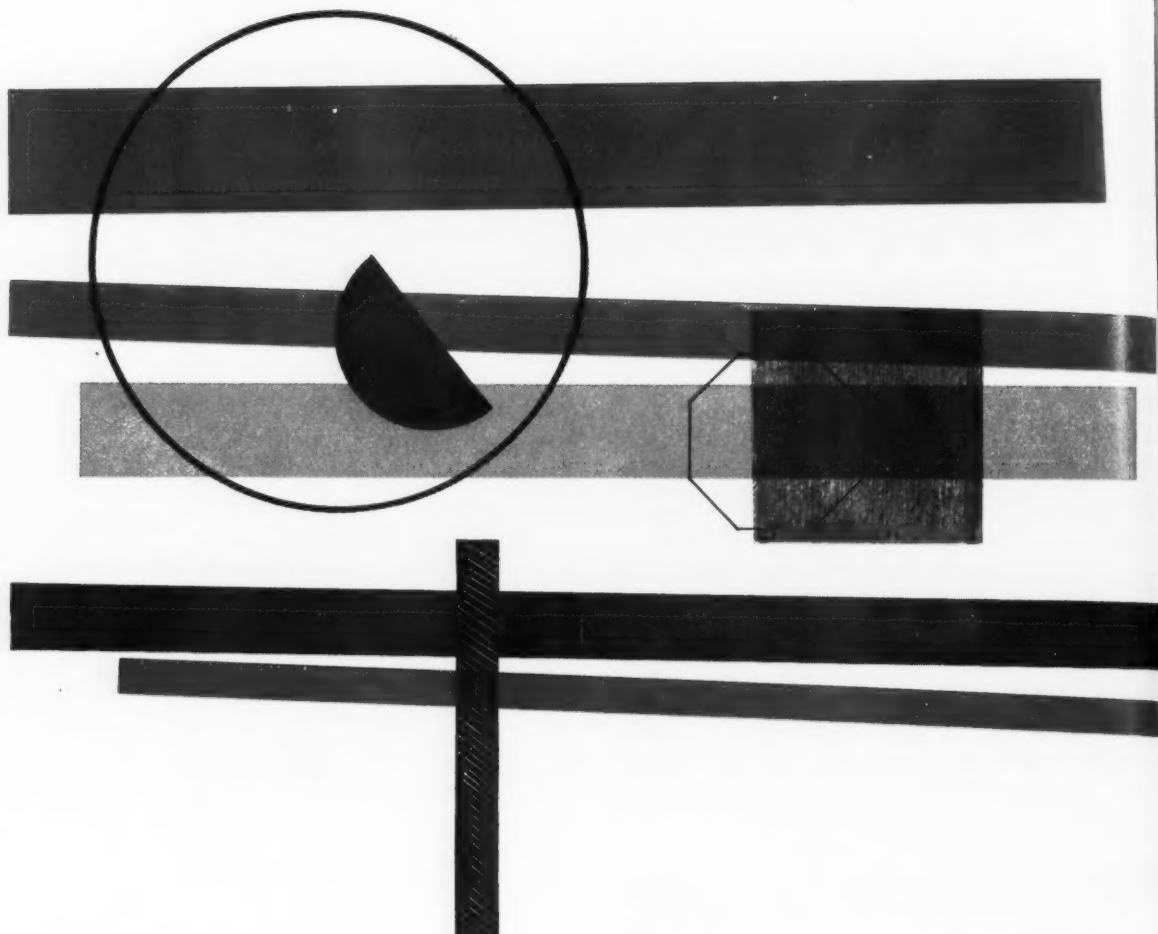
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48 page handbook



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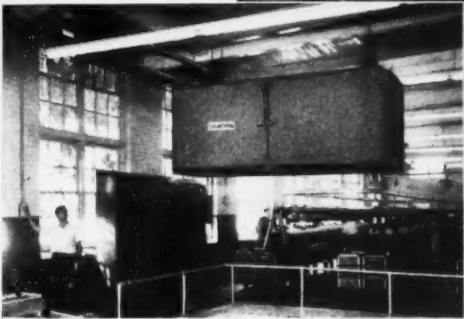
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# Automatic Handling System Brings **BIG SAVINGS**

*Operates Between Buildings  
Without Operator*

A Tramrail freight-carrying van leaving one building. Building doors open and close automatically. Tramrail track is high and above interference with railroad. The entire handling system is very safe.



Operator pushes wall button to start van on its way. Van rises until it reaches Tramrail carrier on track. Then carrier hauls van to building selected.



**R**AIN or shine, this Cleveland Tramrail system works without complaint. Inclement weather is of no concern, because no one has to go outside to operate this system.

The Tramrail freight-carrying van travels between buildings as directed by the touch of a pushbutton. It goes up and down grades and handles materials between different floor levels.

No regular operator is needed for this type of system. Usually the time required to dispatch loads is so little that production workers can do this along with their normal duties.

Great savings are made with Cleveland Tramrail automatic handling systems. They cut handling time enormously. They operate overhead above usual floor traffic and hindrances. They

save floor space. They eliminate expensive floor repairs which floor conveyances make necessary. Tramrail equipment requires far less maintenance than usually is necessary with other types of conveying equipment.

Because the dividends are large and immediate when you install a Cleveland Tramrail automatic handling system, it will be to your interest to get the facts on what Cleveland Tramrail engineers can do for you.



Write for free "Automatic Handling" booklet.

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WESTERN INDUSTRY/MARCH 1961

19

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# R HORIZONS System

## STOPS RUST AND PROVIDES LASTING BEAUTY

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**Apply Rust-Oleum 769 Damp-Proof Red Primer directly over sound, rusted surfaces to STOP RUST and cut maintenance costs**

Just scrape and wirebrush to remove rust scale and loose rust—then brush Rust-Oleum 769 Damp-Proof Red Primer right over the remaining rust. Its specially-processed fish oil vehicle penetrates rust to bare metal as proved in radioactive tracing studies. You save time and money, as costly surface preparations are usually reduced.

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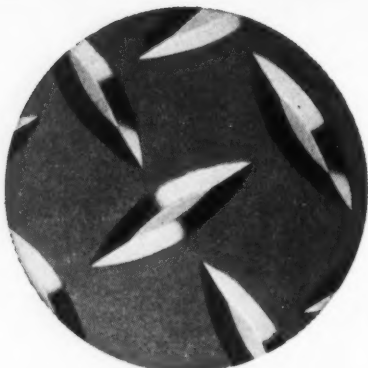


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**RUST-OLEUM CORPORATION**  
2984 Oakton Street • Evanston, Illinois

At no cost or obligation, please send me:

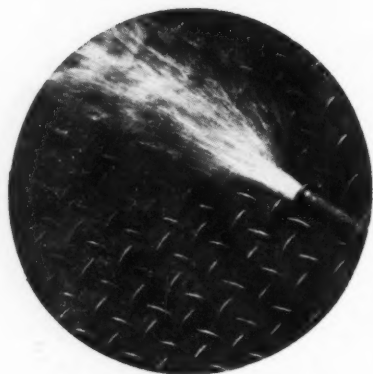
- ☐ New full-color catalog on New Color Horizons System and specialized Rust-Oleum systems. Including color charts and applications.
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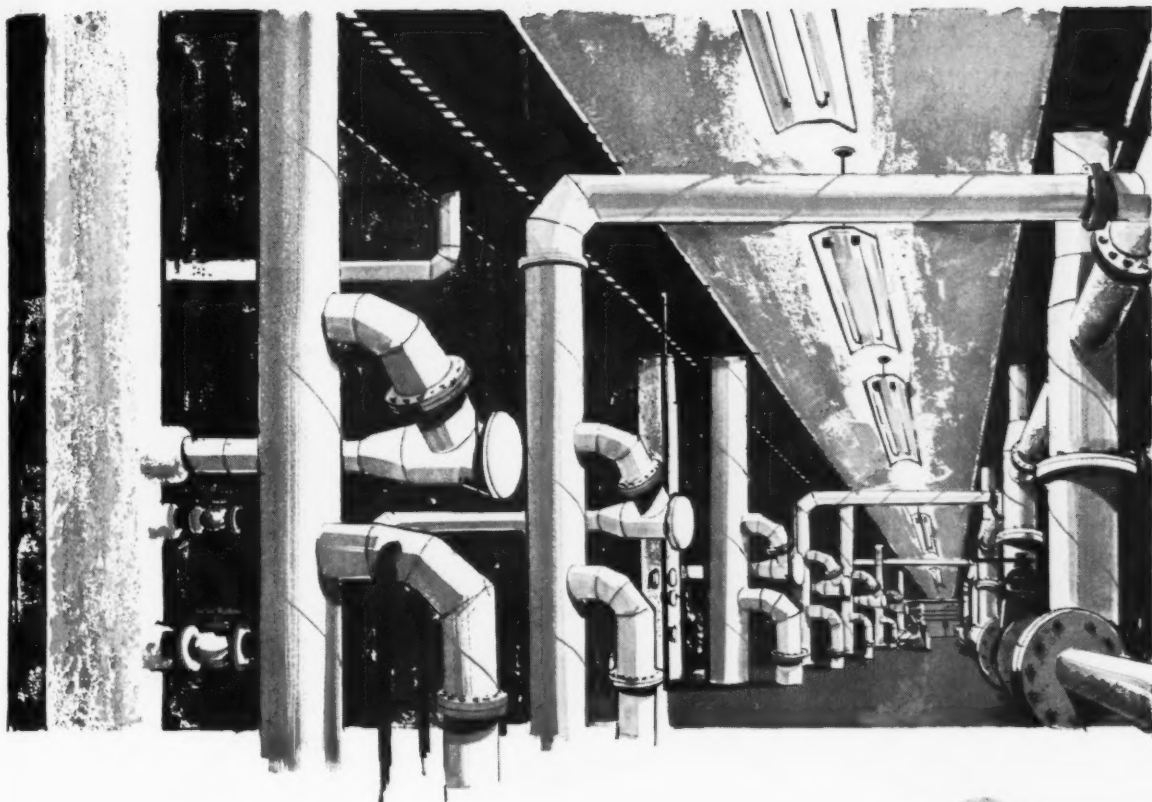
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WESTERN INDUSTRY/MARCH 1961





# Armco Pipe Eliminates Plant Piping Problems At Every Turn



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When you specify and use Armco Welded Steel Pipe for your plant piping, water supply or steam lines, you gain a unique advantage that can save money, installation time, and eliminate a source of possible maintenance. That advantage is the Armco "FITTING SERVICE." Wyes, tees, elbows and other standard and special fittings are supplied already attached to straight pipe sections. Everywhere your pipe line bends, you can save the cost and installation of at least one pipe joint. And, of course, where there is no coupling, there is no opportunity for a leak to develop.

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**ARMCO** Drainage & Metal Products

## STANDARD ENGINEER'S REPORT



# World's largest Fruit Pre-cooling plant prevents breakdowns...relies on Chevron Oil

**Modern Ice & Cold Storage Company,** San Jose, California, stores more cannery stock than any other warehouse in the world. They keep one and a half million boxes of cannery fruit "on ice" each year. With this kind of investment, you can't run the risk of compressor breakdowns.

"Our big ammonia compressors are lubricated with Chevron Multi-Machine Oil ICH," reports Plant Engineer William Cranston. "Despite extreme suction and discharge temperatures, and continuous round-the-clock operation, these compressors show negligible

cylinder bore wear. Bearings, rings and pistons are exceptionally clean, give long life."

**Chevron Multi-Machine Oil ICH** proved itself superior in tests the firm ran with various other oils. It continues to give excellent service in compressors operating from 2000 to 6000 hours a year. "In over 16 years, we haven't had a single failure due to lubricant!"

**Equipment Note:** A battery of 13 Kohlenberger compressors plus 2 Fuller rotary boosters and 2 Hi-Speed Vilters supply refrigeration power at this huge

plant. Chevron Multi-Machine Oil ICH is used throughout.

**Lubrication Problems?** Let a technically qualified Standard Engineer solve them for you. His practical experience and wide range of top quality Standard products assure an economical solution to your lubrication problems.

**The largest field force of lubrication engineers in the West is at your service. For this valuable free technical help, just call your local Standard office or write Standard Oil Company of California, 225 Bush St., San Francisco, 20.**



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*CONTINUOUS CASTING OF ALUMINUM extrusion billets is possible at Michael Flynn Mfg. Co. plant in Calif. using machine by Lobek Casting Processes that simultaneously casts 24 billets 6-in. in diameter by 20-ft. long with a production of over 20,000 lbs. per hour. Billets are of superior surface quality and internal structure.*

## METALS & METALWORKING

A SPECIAL



REPORT

Your report on what's happening in the West plus trends in this all important field.

**O**NE DOMINANT TREND is being felt throughout the whole field of metals and metalworking in the West. The trend is towards quality control. It shows up in every area and can be considered a basic factor in many of the newer developments that have appeared. In metals and metallurgy almost all of the advances have been due to increased purity and more precise control of processes. In such areas as machining, casting, or welding, engineers are seeking equipment that permits greater precision.

While this trend towards quality and precision is not alone it dominates the field. Obviously the West with its preponderance of metalworking in the missile, air-

craft and electronics industries is vitally concerned with quality control. Because of the demands made by these Western industries one can say with some accuracy that Western manufacturing has sparkplugged the new developments now appearing. Of considerable interest too is the fact that while for some years past there have been isolated instances where high quality and very close tolerances were required and achieved, now there are many cases where this is true. Metalworking plants are beginning to reap the benefits of this in the ordinary materials and standard equipment now being offered on the market.

Steel continues to be the dominant metal used in



**NEW OIL TEMPERED SPRING WIRE LINE** at Colorado Fuel & Iron Corp. South San Francisco plant is the first one in the West. Line is unusual in that it can be used for wire from .041-in. to  $\frac{3}{8}$ -in. Secret of flexibility is radiant tube atmosphere controlled hardening furnace that allows precise atmosphere control for all sizes of wire.

manufacturing. Common steels are being improved with a trend to more uniformity, more precise control and fewer flaws. Common steels are becoming stronger. There have been advances too in decreasing their manufacturing costs.

One newer development is a much thinner steel for tinplate for making cans. The steel has an increased strength per weight and savings in weight have amounted to 30 to 45 pounds per standard 90-lb. box.

Alloy steels are increasing in use. Of this group stainless steels are showing the greatest increase. One of the newer developments is bonding ultra thin stainless with a backup material for panels used in building.

Two trends continue in alloy steels. The first is to high strength-to-weight alloys. A number of products are available such as constructional alloy steels with a tensile strength of 115,000 psi and a yield strength of 100,000 psi and flat products that will produce 300,000 psi or even higher strength levels. This strength to weight trend is even found in some of the newer carbon steels. An example is a new steel group developed by adding minute doses of columbium, which increases tensile strengths from a 44,000-55,000 range to 65,000-80,000 psi.

A second trend is to alloys that hold their strength under high temperatures. Typical of this field is S-816, a cobalt based alloy that maintains its strength and stability at temperatures up to 1500 degrees F. It is used on such applications as that of a nutating disc air motor actuator developed by Marquardt Corp.,

Van Nuys, Calif., for jet aircraft.

#### NONFERROUS METALS

Of all nonferrous metals aluminum is seeing the most use. Due to considerable research a number of improved alloys have been developed, many of which have increased strength. Developments have also been made in improving welding characteristics. Aluminum is showing increased use in transportation, construction, electrical, and canning fields. Despite this there is a trend showing up where some of the metals aluminum replaced, are now beginning to replace it. Aluminum usage will still probably increase but due to active R&D programs by the copper and steel industries and metallurgical developments in both these fields, competition on which metal to use is now much keener.

Copper is showing an increase in use. According to one Western metallurgist, this metal has great possibilities for development, for in the past very little research has been done on copper. Now R&D work has been increased by the copper industry. This coupled with price stability and opening of new reserves is bringing copper back some of its old markets such as, auto keys, hub caps, electrical apparatus, and forgings.

Zinc is another metal that is beginning to come alive. One important reason why is the development of improved plating methods that give ten-fold longer surface life to die cast zinc components. Galvanizing use with steel is also continuing its upward trend.



Titanium's use was severely curtailed by the switch from aircraft to missiles and fundamental limitations in its high heat properties. However costs for fabricated products are coming down significantly and civilian markets slowly growing. Titanium could start to show good growth in the next few years.

Of extreme interest to the missile industry in the West are the refractory metals. These include molybdenum, columbium tungsten and tantalum. Others are zirconium, beryllium, vanadium and chromium. Refractory metals possess the extremely high-strength-to-temperature qualities over an extended period of time. Considerable research is being done in this field and one of the most promising developments has been vacuum melting using an electron beam furnace. With it ingots of columbium and molybdenum can be made extremely pure. This does not affect the high temperature properties yet provides a metal that is easily workable at room temperatures. The electron beam furnace is a Western development that has created considerable interest throughout the country. The developer of this furnace is Temescal Corp., Berkeley, Calif. Due to increased market for columbium the firm is building larger units that will more economically produce larger ingots.

#### CASTING

There are a number of trends in the casting field. Casting has been making a comeback. This field until a few years ago had a high percentage of manual operations. Newer casting techniques and equipment are changing this. One example is the development of continuous casting equipment. As machining costs mount and the quality of castings improve and their prices go down, many Western firms are turning to cast parts, especially for precision castings, that eliminate difficult machining operations.

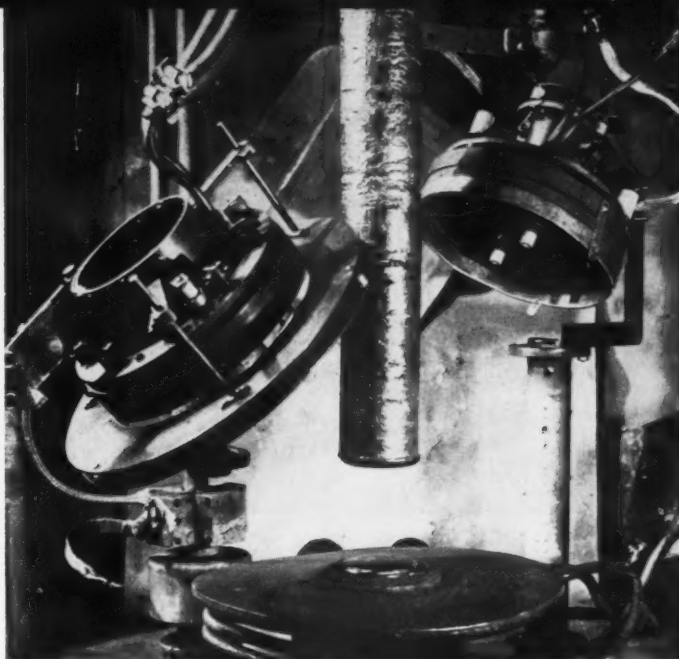
A new trend in the West is the emergence of large precision castings. The process involves use of a ceramic mold. Another trend, a continuing one, is the upgrading of materials used. The trend is away from iron to steel and from steel to alloy and stainless steels.

For instance, engineers at Weyerhaeuser's Everett, Washington sulfite plant are now using stainless castings to increase the service life of two sulfur dioxide headers. Each 30-in. header carries hot corrosive  $\text{SO}_2$  gas from a sulfur burner to the cooling pond. Originally the headers were made of high chromium cast iron, and sections had to be replaced every  $2\frac{1}{2}$  years. A test was made over 15 years ago using a stainless cast elbow. This part is still in operation and now all other parts of the headers are being replaced, for, despite higher cost stainless castings have shown a life of over 7 times those previously used.

Vacuum melting is being utilized more and more for castings as the need for more intricate castings increases. The vacuum melting either by electron beam, induction or arc methods can provide casting metal free of inclusions and gases. This is a coming field in casting.

#### FORMING

In forging the trend in the West is to more explosive forming. This is especially true in the aircraft and

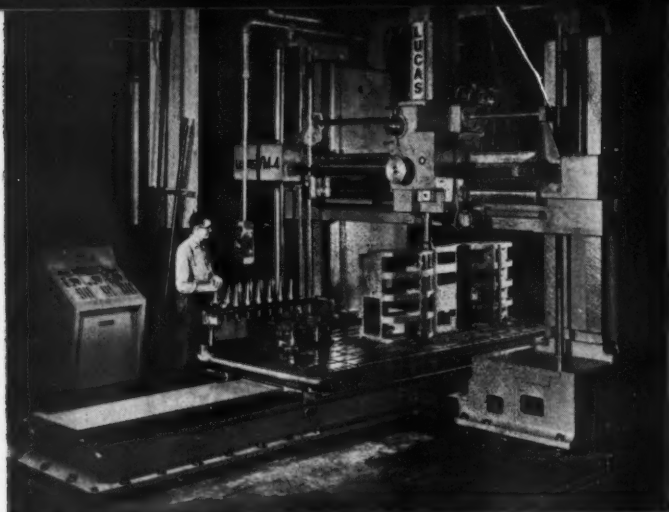


*HEART OF ELECTRON BEAM vacuum melting furnace at Temescal Metallurgical Corp., Berkeley, Calif. Ingot protruding down is melted at end by electron beams coming from circular units on either side. Metal, in this case columbium, drips down and reforms on bottom billet. During process impurities are vaporized. As lower billet is built up it is retracted while upper billet is fed down. Feature of process is that molten metal never touches any crucible that might impart impurities.*

missile industries. A lot of research is being done in this field and the problems involved are gradually being solved. Explosive forming can form many parts, especially larger ones not possible by conventional methods. A major difficulty is in exactness. Often to produce correct result much trial and error is needed. New development here is GE capacitor discharge electro-spark forming that creates a controlled explosion using no chemical explosives. Here electrical blasts create high intensity shock waves which are directed against the metal pieces. On shock wave impact the metal takes the shape of the die. Process is still new and has not been tested enough to realize complete potential, however it should be valuable for many jobs.

Look for increasing use of powder metal parts as newer developments include ability to produce larger parts and make them stronger. Also presses for compressing parts are becoming faster.

Probably the strongest metalworking trend of long standing in the West is to the use of stamping and forming presses wherever possible. For every day jobs presses are particularly well suited to the West. Inherently they are a flexible inexpensive method of achieving limited volumes and may with ease increase volume as needed with little extra cost. You can expect increased use of coil stock too. Presses have undergone constant improvement during the years. Another interesting development in processing is in mak-



**MACHINING** part of rear drive of road grader at EIMCO plant in Salt Lake City with Lucas Versa-Tronic vertical boring, drilling, and milling machine. Machine tool can be operated by numerical tape control, by key selection control or manually. Note tool holder near operator. Machine can be set to automatically change tools as needed and reposition self accurately.

ing parts by stacking stampings and bonding them together.

Look for broader applications of inert gas, shielded metal and tungsten arc welding. Electron beam welding shows promise of overcoming difficulties of joining refractory metals, high thermal conductivity metals and highly reactive metals. Ultrasonic welding has entered the production phase. Its low power requirements make it particularly attractive for aluminum fabrication. Presently used for thin gauge metal, it should be further developed for welding thicker gauges. A feature is method's ability to weld dissimilar materials in multi-layers.

Electroslag welding is another process that will bring savings to fabricators using submerged arc welding to join plates 2-in. or more thick. The joint is placed vertically and the machine makes the complete joint in a single operation.

CO<sub>2</sub> welding has proved itself in production and its use is expanding. Buttonwelding is an outgrowth of this method, placing a small button through two solid sheets of material automatically. It too should gain wider acceptance.

A general trend in welding is towards automation. We are seeing more automatic speeds, automatic controls and automatic guidance. While many of these features are aimed at increased production there is also an element of quality control. Some areas need precise control not possible manually to produce welds required by many Western users.

In brazing the trend is towards heating of large brazed assemblies by blanket heaters, pyroforic coatings, luminous wall furnaces and quartz tube heaters. Honeycomb brazing is an important application. Sections of honeycomb, being brazed, are steadily increasing in size. This method shows signs of expanding to other industries.

The plasma torch is a recent development for use on high temperature reactive metals. It has applications with difficult cutting problems, metallizing and spraying.

## MACHINING

The two most important trends in machining in the West are (1) a trend to short lot efficiency and (2) a move to increased precision. Both of these areas are extremely important to industry in the West.

One of the developments that shows great promise for the future in limited lot production is numerical control. Most machine tool builders are making at least one numerically tape controlled machine and some have several models. Just as there are a number of machines available there are many different numerical control systems. Basically they operate in the same way. Numerical information is fed into the system using punched tape, punched cards or magnetic tape. The material is translated into electrical form usable by the machine tool and stored in a memory system. Servo units then convert the information into actual machine motions and a gauging device measures these motions to determine if the servo units were correct. A feedback device, on closed loop systems, feeds data back from the gauging device to compare the response with the command so that the machine can be stopped or corrected if needed.

Numerical control saves in set up time, machine time, finishing and inspection. Less tooling and less expensive tooling is needed. Precision is often greater too. All this adds up to money saved. For example Lockheed manufacturing branches of the California Division through adapting numerical controls to lofting and tooling of the U. S. Navy's P3V patrol plane saved over \$160,310. Applying the same technique to tooling and production of certain F-104 Super Starfighter parts saved an additional \$93,712.

Numerical control is not the only advance in short lot efficiency. Automatic machines are becoming increasingly more versatile. Single spindle automatic turning machines are being used frequently in place of hand operated turret lathes. Hand operated machines are being built with more automatic features such as automatic speed and feed changes. This means that less of the operator's effort and control are needed.

Machine tools are steadily being built to machine with greater precision. Manufacturers, especially those in the missile and aircraft industries are demanding it. Some machining jobs in these industries require an accuracy within millionths. One reason for this is that many of the exotic metals used cannot be ground without taking on harmful impurities. They must be machined to desired tolerances.

It is not unusual for a machine tool manufacturer to sell a lathe accurate within .0002-in. In fact according to one Western expert in machine tools, a basic standard lathe is used with certain alterations made in the slides and spindle to achieve extra accuracy.

What does this increased inherent accuracy being built into standard machine tools mean to a regular user, one whose jobs are not of an extremely high precision nature? It means two things. First, there is



**UNDERWATER ELECTRICAL EXPLOSIONS** described as capacitor discharge electro-spark have been developed by General Electric. When employed for forming metals they offer possibilities far in excess of explosive forming by chemical explosives now used in that precise control is possible.

less chance for error and therefore less scrap on a job. Second, there is a possibility that some grinding operations can be eliminated, reducing costs considerably.

Machine tools are continuing to show an increase in speeds and feeds. There is also an increase in rigidity and stability. These are all long time trends. With them is found an improvement in carbide tooling. The development of throwaway carbide tools and improvements in consistency of grades have made carbide tooling extremely attractive. Ceramic tooling is receiving research and its development, though at present somewhat behind that of carbides, would appear to follow in the same path.

Grinding wheels have shown constant improvement too. The industry has made advances designed to eliminate wheel variation and satisfy a customer demand for precise duplication of grinding wheels. New developments have been made in bonds and abrasives, such as an aluminum oxide abrasive grain with a different crystallation for heavy duty wheels.

In grinding there is increased use of abrasive belts. An example of use is close tolerance finishing of stainless steel stock and honeycomb. Electrolytic grinding is another recent development.

All of these new trends and developments are significant for the West can benefit substantially from them. For almost the first time many new developments are particularly adaptable to Western manufacturing and could go far towards reducing manufacturing costs and placing this area in a more favorable competitive position.

**WATCH  
for the  
PLANT  
ENGINEERING  
AND  
MAINTENANCE  
ISSUE  
OF  
WESTERN  
INDUSTRY  
IN JUNE**

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*TYPICAL VIEW of what you can expect when you visit the Western Metal Exposition at the Pan Pacific Auditorium, Los Angeles on March 20-24. Photo is one taken at the Show two years ago.*

## WESTERN METAL CONGRESS & EXPOSITION

A round-up on events and exhibitors  
designed to provide you with advance  
reference information about the show.

**S**TEADILY ERUPTING ADVANCES in metals development, engineering and fabrication throughout the West have prompted the American Society for Metals to make its 12th Western Metal Congress and Exposition, March 20-24, in Los Angeles, the most advanced and informative event of its kind.

This is the comment of Allan Ray Putnam, managing director of the society, who states that exhibits and technical sessions staged under the show theme, "Idea Center for Industry-West" are designed to provide a wealth of technical information to general industry.

Running concurrently will be technical sessions provided by five professional societies and an exposition of the latest products, tools and techniques in metalworking. More than 315 firms will be represented by 225 exhibits filling Pan Pacific Auditorium and adjacent pavilion at 7600 Beverly Blvd., Los Angeles.

Technical societies will present a 34 session program over the 5-day period that will provide up-to-date information on a wide range of metalworking topics in more than 100 papers covering the selection, testing, fabrication and application of metals for practically every purpose in the defense and general industries. Tech sessions are scheduled for the Ambassador Hotel, 3400 Wilshire Blvd., Los Angeles.

In Putnam's opinion, the Congress and Exposition will be welcomed by the largest turnout in the history of the dual event. Registration at former shows has topped 33,000. However, gate count has shown attendance in excess of 50,000 visitors, pointing to the fact that interested people return for second and third looks at display areas. Major attendance categories are in metalworking engineering, plant operation management, and purchasing fields.

Due to predominance of defense-based industry



## SHOW HOURS

Hours during which the exhibits will be open at the 12th Western Metal Show at Pan Pacific Auditorium are the following:

Monday, March 20; Tuesday, March 21; Wednesday, March 22; Noon to 10 p.m.

Thursday, March 23; Friday, March 24; 10 a.m. to 6 p.m.

Pan Pacific Auditorium is located at 7000 Beverly Blvd., near the intersection of Fairfax Ave. and Beverly Blvd., Los Angeles. Phone is WEbster 8-3456.

in the West, production of aerospace vehicles, missiles, rockets and the hypersonic airplane will receive particular attention from authors of technical papers and planners of displays.

Of interest to general industry will be numerous displays and demonstrations of metalworking, alloying, heat treating, testing, welding, cutting, grinding, boring and degreasing.

It is particularly significant that Los Angeles is chosen as the Metal Show site, Putnam indicated, as Los Angeles County is now the largest metalworking county in the United States, according to Dun and Bradstreet's new Metalworking Directory.

To furnish representatives of this and other major geographical segments of West Coast industry with the latest in technical information, the American Society for Metals has joined with the American Society for Testing Materials, Society for Nondestructive Testing, Society for Aerospace Material and Process Engineers, and the Metallurgical Society of American Institute



**MAJ. GEN. O. J. RITLAND**, commander, U.S. Air Force BMD, Air Research and Development Command, Inglewood, Calif., is principal luncheon speaker during opening day ceremonies sponsored by the Los Angeles Chapter, American Society for Metals, at the Ambassador Hotel, March 20.



**THIS HEAVY MISSILE FORGING** in hands of H. A. Curwen, conference chairman of the 12th Western Metal Show, symbolizes new production methods to be revealed at the Exposition, sponsored by American Society for Metals, March 20-24 at Pan-Pacific Auditorium, Los Angeles. From left are William V. Ward, general chairman for the event, Chester L. Wells, ASM manager of expositions, Curwen, and Norbert F. Vinatieri, reception chairman.

of Mining, Metallurgical and Petroleum Engineers to present a five day informational program of panel sessions, papers and seminars.

Three additional events of importance will be sponsored by Western chapters of the ASM.

One will be a Ballistic Missile Division Luncheon addressed by Maj. Gen. O. J. Ritland, in the Ambassador Hotel Cocoanut Grove, noon, March 20. Immediately afterward, a classified briefing session under Air Force direction will be offered for metal show delegates with prior security clearances.

The third ASM sponsored event will be an Aerospace Corp. session on materials slated for the morning of March 21.

More than 50,000 admission-invitations have been passed out by the ASM to membership of Western chapters of engineering and technical societies. In addition to these, additional invitations have been sent by exhibiting firms to a wide range of potential show attendees.

The admission-invitation enables the recipient to register, without-fee, to attend all five days of the Pan Pacific exposition. Upon registration he will receive a Congress program, including listings of all exhibits and their locations either in the main exhibit hall or adjacent pavilion.

To help exposition visitors to get the most informational benefit from exhibits, each will receive an "Informa-Badge", consisting of a plastic card embossed with his name, position, plant or firm name and location. This will serve as his personal identification and as a card that can be placed in an imprinting device located at each booth.

If a delegate wishes to receive literature or further information through the mails, he will hand over his card that will print his name on a mailing list.

# TECHNICAL PROGRAM

	MON. MARCH 20	TUES. MARCH 21
<b>SOCIETY FOR NONDESTRUCTIVE TESTING</b> Venetian Room	<p><b>9:00 a.m.—NONDESTRUCTIVE TESTING OF ROCKETS AND MISSILES</b> The Lie of Reliability Radiography of Solid Propellants With a Linear Accelerator Source Theory of Differential Radiological Inspection Systems Radiological Inspection of Solid Propellant Rocket Motors</p> <p><b>1:30 p.m.—NONDESTRUCTIVE TESTING OF ROCKETS AND MISSILES</b> General Survey of Nondestructive Testing of Solid Propellant Rocket Motors Ultrasonic Evaluation of Bond Integrity on Missile Components Proper Magnetic Particle Testing Means Savings and Improved Reliability of Missile Fuel Cases Ultrasonic Inspection of Liquid Propellant Rocket Motor Components</p>	<p><b>9:00 a.m.—NONDESTRUCTIVE TESTING OF ELECTRONIC COMPONENTS</b> A Concept of Systems Test Correlation between Nondestructive and Destructive Tests in Electronics Capacitor Resistance and Absorption Testing Radiography and Polarographic Testing of Electronic Components Electrical and Mechanical Effects of Transducer Design Dual Session, Isotopes in Industry (Panel session)</p> <p><b>1:30 p.m.—HONOR SESSION</b> High Energy Nuclear Radiations, Their Implications for Industry DuPont Award</p>
<b>AMERICAN SOCIETY FOR METALS</b> Ambassador Ballroom	<p><b>9:00 a.m.—METALS RESEARCH</b> Discolorations Electron Microscopy Micrometallurgy</p> <p><b>2:00 p.m.—METALS RESEARCH</b> Crack Propagation Forming Limitations and Plastic Flow Stress Corrosion</p>	<p><b>9:00 a.m.—PROCESS METALLURGY</b> Alloying During Welding Electron Beam Melting and Welding Ultrasonics in Casting</p> <p><b>2:00 p.m.—VALUE ENGINEERING</b> Need for Value Engineering New Approach to Value Value Engineering—A Functional System Examples of Value Engineering The Place of Value Engineering in Industry</p>
<b>AIR FORCE-AEROSPACE BRIEFING SESSIONS</b> Sunset Room	<p><b>2:00 p.m.—AIR FORCE ADVANCED SYSTEMS BRIEFING</b> Future Missile Systems Air Force Space Systems Under Development Advanced Plans for Space Systems</p> <p>Attendance restricted to those having proper A. F. security clearance</p>	<p><b>9:00 a.m.—AEROSPACE MATERIALS SESSION</b> Recent Developments and Trends in Aerospace Materials Advances in Refractory Metals for Aerospace Applications Aerospace Manufacturing Methods—The Keystone to Progress Environmental and Design Parameters for Future Aerospace Vehicle Systems</p>
<b>AMERICAN INSTITUTE OF MINING METALLURGICAL &amp; PETROLEUM ENGINEERS</b> Sunset Room		<p><b>2:00 p.m.—MATERIALS AT THEIR HIGHEST STRENGTH—WHISKERS</b> Behaviour of Whiskers at Elevated Temperatures and their possible application in Composites Size Effects in Ultra-Strength Materials Strength of AL203 Whiskers Coated with Metallic Films Room Temperature Twinning as a Cause of High Tensile Strength of Iron Whiskers Graphite Whiskers</p>
<b>AMERICAN SOCIETY FOR TESTING MATERIALS</b> Boulevard Room		

# Useable timetable of all societies' meetings

WED. MARCH 22	THURS. MARCH 23	FRI. MARCH 24
<p><b>9:00 a.m.—NONDESTRUCTIVE TESTING IN THE AIRCRAFT INDUSTRY</b>  Nondestructive Testing's Part in Aircraft Reliability  A New Technique in Aircraft Radiography  Nondestructive Testing at Lockheed  Nondestructive Testing in the Field  Nondestructive Testing at Boeing Airplane Co.</p> <p><b>DUEL SESSION—NONDESTRUCTIVE TESTING IN THE OIL INDUSTRY</b>  <b>1:30 p.m.—SELECTIVE TESTING MEANS SAVINGS</b>  Ultrasonic Testing of Reinforced Plastics and Ceramics  Nondestructive Testing of Reinforced Plastics and Resin Ceramic Composites  High Energy Radiographic Shielding  A Method of High Voltage Calibration in Industrial X-Ray Apparatus  Nondestructive Testing in Heavy Manufacturing</p> <p><b>DUEL SESSION—NUCLEAR DEVELOPMENTS IN TESTING</b></p>	<p><b>9:00 a.m.—NONDESTRUCTIVE TESTING IN THE SHIP-BUILDING INDUSTRY</b>  Nondestructive Testing—Measurement of Material Characteristics  Evaluation of Materials for Nuclear Powered Submarines  Eddy Current Testing of Ferrous Tubing Using Saturation Techniques  Radiography of Cast Nuclear Components By Means of Kilocurie Cobalt Sources</p> <p><b>1:30 p.m.—SELECTIVE TESTING MEANS SAVINGS</b>  Wonderful Word of Reliability  Radiographic Correlation of Cast High Temperature Alloys Using Constant High Tension Equipment  Current Radiographic Inspection Procedures for Welded Highway Bridges  Radiography of High Voltage Power Line Conductors  Quality Control at Electric Steel Foundry  Recent Progress in Hi-Speed Radiography</p>	<p><b>9:00 a.m.—EDUCATIONAL CLINIC—NDT</b>  Welcome  Orientation, Scope of Present SNT Field  Radiography Including Isotope Radiography  Fluoroscopy  Magnetic Particle Inspection  Leak Detection Methods</p> <p><b>1:30 p.m.—EDUCATIONAL CLINIC</b>  Ultrasonics (Theory)  Ultrasonics (Application and Interpretation)  Eddy Current Test Methods  Penetrant Inspection</p>
<p><b>9:00 a.m.—LABORATORY METHODS</b>  Elevated Temperature High Speed Testing  Cryogenic Testing  Elevated Temperature Compression Testing  Liquid Metal Testing</p> <p><b>2:00 p.m.—HEAT TREATING METHODS</b>  Heat Treating of Steels and Heat Resistant Alloys  Equipment Coatings  Atmospheres Techniques</p>	<p><b>9:00 a.m.—METALLURGY FOR ADVANCED DESIGN</b>  Refractory Alloys  Welding Refractory Alloys  Plasma Jet Coating Techniques</p> <p><b>2:00 p.m.—METALLURGY FOR ADVANCED DESIGN</b>  Vacuum and Consumable Electrode Melting  Induction Melting  Consumable Electrode Melting  Rocket Case Applications  The Forger's Viewpoint</p>	
<p><b>SOCIETY OF AEROSPACE MATERIAL &amp; PROCESS ENGINEERS</b>  Boulevard Room</p>	<p><b>8:45 a.m.—SYSTEMS AND DESIGN PROBLEMS</b>  Materials System Program  Design Problems in the Use of Metallic Materials for Space Vehicles  The use of Composite Materials in Hypersonic Flight  Correlation of Mechanical Test Results with Material Behaviour in Structures</p> <p><b>1:30 p.m.—R &amp; D ON SPACE VEHICLE MATERIALS</b>  Tensile Properties of Pyrolytic Graphite to 5000 F  Some Research on Prestressed Ceramics  Effects of Environment on Deformation and Fracture Process in Ceramics  Refractory Material Composites</p>	
<p><b>9:00 a.m.—VACUUM THIN FILM METALLURGY</b>  Metallurgy, Structure and Application of Thin Films  Introduction to Magnetic Thin Films  Analysis of Thin Films by Electron Microscopy, X-Ray Diffraction and X-Ray Spectroscopy  Thin Films as Corrosion Indicators</p> <p><b>2:00 p.m.—REFRACTORY ALLOYS—PROPERTIES</b>  Tantalum Alloys for High-Temperature Applications  Oxidation of Tungsten at Low Pressure and High Temperature  Dispersion Strengthening of Molybdenum at High Temperatures  High-Temperature Mechanical Properties of Tungsten-Columbium-Tantalum Alloys  Welding Fabrication of Molybdenum 2800-3000 F Supersonic Ram Jet Tail Pipe (color movie)</p>	<p><b>9:00 a.m.—PLASMA ARC APPLICATIONS TO METALLURGY</b>  Plasma Arc Applications to Metallurgy—Technical Parameters, State of the Art, Future Developments in Hardware  Process Variables in Plasma Jet Spraying  Plasma Techniques for Spraying Toxic and Oxidizable Materials  Fabrication of Complicated Refractory Metal Shapes by Plasma Arc Spray Techniques  Air Force Interest in Plasma ARC Spraying</p>	
<p><b>9:00 a.m.—EFFECTS OF CONDITIONING OR PROCESSING ON FATIGUE CHARACTERISTICS OF METALS</b>  Improvement in Fatigue Resistance of Aluminum Alloys by Mechanical Surface Prestressing  Crack Propagation and the Service Fatigue Strength of Steel  Master Fatigue Curves</p>		



*TYPICAL OF INTEREST* caused by the Western Metal Show is this scene taken at the 1959 Show. At that time some 40,000 metals men converged on the Pan-Pacific Auditorium, Los Angeles. The 1961 event promises to be larger still.

## LIST OF EXHIBITORS

### EXHIBITOR

### BOOTH NO.

Aaron Machinery Co., Inc.	660
Ace Drill Bushing Co., Inc.	757
ACF Electronics Div.	921
Acme Steel Company	115
Alert Supply Co.	711
Alexander Machinery Co., Inc.	650
Allison-Campbell Division, American Chain & Cable Co., Inc.	502
Alloy Products Corporation	472
Alnor Instrument Company	516
Alphatizing, Inc.	234
Aluminum Company of America	567
Anchem Products, Inc.	280
American Chain & Cable Co., Inc.	502
American Chemical Paint Co.	280
American Hardware Corporation	141
American Machine & Metals, Inc.	435
American Climax, Inc.	376
American Pullmax Co., Inc.	683
American Society for Metals	450
Andrews Hardware & Metal Co.	581
Arcturus Manufacturing Co.	371
Arrowsmith Tool & Die Corporation	616
Arwood Corporation	321
Asco Sintering Corporation	566
Atlas Press Company	360
Barber-Colman Company	720
Baron Industries	459
Battelle Memorial Institute	122
Bausch & Lomb Optical Company	215
Beryllium Corporation	542
Black & Decker Manufacturing Co.	624
G. S. Blakeslee & Company	477
Boeing Applied Computing Services	1249
Branson Instruments, Inc.	687
Braun Chemical Co.	221
Bridgeport Machines, Inc.	949
Buck Tool Company	173
The Budd Company	738
Buehler, Ltd.	233
Bunting Brass & Bronze Co.	959
Cable Distributors, Inc.	1112
Cal Testing Machine Co.	265

### EXHIBITOR

### BOOTH NO.

California Doran Heat Treating Co.	333
Carey Scale Company	844
Cazeneuve Sales Company	133
Centrifugal Casting Company	641
Cerro Sales Corp.	809
Chainveyor Corp.	112
Challenge Machinery Co.	642
Chem-Mill Division	473
Chromizing Corporation	838
Clausing Division	360
Climax Molybdenum Company	376
Cobalt Information Center	122
Collins Microflat Company	534
Color-Matic Sales & Service Co.	747
Commander Manufacturing Company	636
Comptometer Corp.	1233
Consolidated Vacuum Corp.	302
Costello Engineering Corp.	629
Crane Packing Company	275
J. J. Cress Co., Inc.	915
Criterion Machine Works	1263
Crucible Steel Company of America	248
Darnall Machinery Co., Inc.	350
De Laval Separator Company	102
Delta Manufacturing Company	739
Delta Power Tool Division	316
Detroit Stamping Company	266
De Vilbiss Company	601
DeWitt Equipment Corp.	844
Di-Acro Corporation	535
W. C. Dillon & Co., Inc.	1116
Diversey Corp.	429
Dow Chemical Company	570
Ducommun Metals & Supply Company	334
Dynumatic Div., Eaton Mfg. Co.	686
Eaton Mfg. Co.	686
Eclipse Fuel Engineering Co.	430
Egloff & Graper, Inc.	341
Engelhard Industries, Inc.	242
Max Erb Instrument Company	856
Erb & Gray Scientific, Inc.	574
Fabriform Metal Products	228
Faststeel Metallurgical Corporation	121
Far-Best Corp.	655
Fenn Manufacturing Company	679
J. C. Fennelly Company	326
Fenway Machine Company, Inc.	183
Field Emission Corp.	532
Fieldtec-Field Engineering Service	1213
Foley Manufacturing Company	836
J. B. Ford Division	628
L. H. Freeman Company	579
Garland Tool & Manufacturing	1237
Gebr. Van der Vinne, N. V.	844
Gemair, Inc.	744
General American Transportation Corp.	1126
General Controls Company	444
B. F. Goodrich Aviation Products	523
Hahn, Hallett Machinery Co.	515
Harry F. Haldeman, Inc.	321
Harley-Pence Machinery Company	637
Harnischfeger Corp.	328
Harshaw Scientific Division, Harshaw Chemical Co.	482
C. I. Hayes, Inc.	586
Haynes Stellite Company	490
Heidrich-Nourse Company	639
A. G. Heinze Co., Inc.	560
Heller Tool Company	631
E. G. Heller's Son, Inc.	134
Hevi-Duty Electric Company	187
Carl Hirschmann Co., Inc.	483
Holden Pacific Corp.	432
Holdridge Manufacturing Company	825
Honite Division, Minnesota Mining & Mfg. Co.	711
E. F. Houghton & Company	536
Hydro-Hone Division, Gemair, Inc.	744
Illinois Testing Laboratories, Inc.	516
Immersion Heating Equipment Company	440
Instron Engineering Company	216
Instrument Development Labs., Inc.	1259
Instrumentation Sales, Inc.	1246
Instruments Division, The Budd Company	450
Instruments Division, Philips Electronics, Inc.	227
International Nickel Co., Inc.	460
Ipsen Industries, Inc.	159
Allan P. James Company	104
Janney Cylinder Company	104





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To put these ideas to work we've taken to the road with a traveling value-analysis clinic, stopping in industrial centers all over the country. We've a truckload of displays representing our principal products to serve as starting points for discussions of the ideas. We're detaching specialists, technical men, mill men, executives to discuss and explain the ideas with all manufacturers who can attend the clinics.

We're also busy generating new ideas in an aggressive research and develop-

ment program. And we plan to make available soon small, balanced value-analysis teams to go out in the field and work with individual company organizations—make specific suggestions and recommendations regarding materials, fabricating methods, design, etc.

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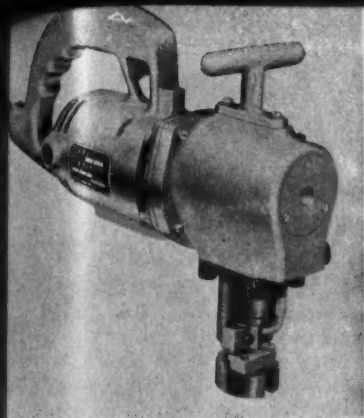
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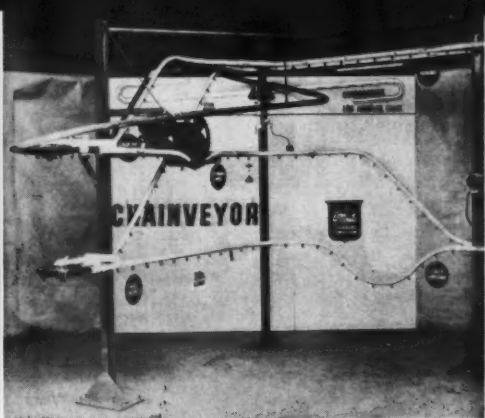
Jarvis Corporation of California	202	Porter Precision Products	176
Jiffy Disintegrators, Inc.	712	H. K. Porter Co., Inc.	1116
I. O. Johansson Company	377	Premmco, Inc.	963
KSM Products, Inc.	863	Product Techniques, Inc.	331
Kelco Sales & Engineering Co.	739	Production Machinery, Inc.	725
Kerns Co., L. R.	402	Pyrometer Instrument Company, Inc.	579
Kerns Pacific Corp.	402	Radiation Electronics Co.	1233
King Publications	1243	Randall Graphite Bearings, Inc.	104
King Tester Corp.	762	Ransburg Electro-Coating Corp.	717
James P. Kinney Company	816	Recco Equipment Co.	915
Kolene Corp.	575	Research Products Corp.	266
Kwikset Powdered Metal Products	141	Riehle Testing Machines Div.	435
Laboratory Equipment Corp.	1244	Rigidized Metals Corp.	666
Lake Chemical Company	1248	Rocketdyne Division	670
Leeds & Northrup Company	678	Rockwell Manufacturing Company	316, 466
LeFiell Manufacturing Company	571	Rontgen Technische Dienst N.V.	844
E. Leitz, Inc.	674	Rutland Tool & Supply Company, Inc.	169
Lennox Tool & Machine Builders	478	Les Sachs Associates	1245
Leonard Precision Products Co.	1221	Sales Engineering Service	716
Lepel High Frequency Laboratories, Inc.	911	Scherr-Tumico Company	165
Lewis Machinery Sales	810	George Scherr Company, Inc.	165
Lindberg Engineering Co.	342	A. Schrader's Son Division	423
Linde Company	490	Schrillo Aero Tool Engineering Co.	1150
R. J. Lison Company	520	Schurs Burner & Equipment, Inc.	420
Los Angeles Dept. of Water & Power	354	Scientific Instrument Division	674
Lubrite Division of Merriman Bros., Inc.	104	Scovill Manufacturing Co., Inc.	423
Lug-All Company	1239	Selas Corporation of America	442
M. B. I. Export & Import Ltd.	825	Selectrons, Ltd.	741
Machinefabriek Van der Lande N.V.	844	Arnold Serton, Inc.	844
Machinery Sales Company	691	Severance Tool, Inc.	352
Magnaflux Corp.	274	Sheldon Machine Company, Inc.	647
Mahr Gage Company	174	Sieburg Industries, Inc.	714
Mariane Development Co., Inc.	741	Simonds Abrasive Company	527
Markal Company	1248	Simonds Saw & Steel Company	527
Marquardt Corp.	281	Solar Combustion Company	327
Marshall Tool & Supply Corp.	150	Southern California Gas Company	416
Master Power Corp.	624	Southern Counties Gas Companies of California	416
Mayhew Products Company	761	Southwestern Agencies	1120
B. W. McIntyre Company	711	Southwestern Engineering Company	682
McKenna Laboratories	1140	Spar-Tan Engineering Company	582
Mercuria Company	1255	Speedlap Corp.	716
Met-L-Chek Company	1260	Dutch Stark Company	1242
Metal Finishing Equipment	711	L. S. Starrett Company	632
Metal Improvement Company	182	State Steel Products, Inc.	1122
Metal Removal Company	710	Stokvis Multiton Corp.	844
Metallographic Exhibit	415	Stone Machinery Corp.	192
Claude Michael, Inc.	531	Storage Rack Systems, Inc.	816
Milbro Engineers	717	Sunnen Products Company	528
Mill Polishing Corp.	925	Supergrate Open Steel Flooring Company	1240
Milwaukee Electric Tool Corp.	467	Superior Tube Company	366
Minneapolis-Honeywell Regulator Company	125	Superweld Corp.	170
Minnesota Mining & Manufacturing Company	711	Supreme Products Corp.	1225
Missimers, Inc.	265	Techno-Products Corp.	266
Mitsui & Company, Inc.	623	Tempil Corp.	365
Molenschot & Zoon N.V., Jan	844	Tin Research Institute, Inc.	126
Montague-Harris & Company	192	Tocco Division	371
National Carbon Company	490	Travis Plating Co.	841
National Diamond Laboratory, Inc.	1241	Trent Tube Company	248
Natural Gas Bureau	416	True-Trace Corp.	677
Natural Gas Equipment, Inc.	416	Tubular Micrometer Company	165
Netherlands Trade Commission	844	Turco Products, Inc.	473
New Hermes Engraving Machine Corp.	862	Turnkey Engineering Company, Inc.	345
Nooitgedagt & Zonen, J.	844	Ulbrich Stainless Steels, Inc.	383
Nordson Corp.	222	Union Carbide Corp.	382, 490
North American Aviation, Inc.	670	Union Carbide Metals Company	382
Norton Company	943	United Shoe Machinery Corp.	820
Nylok Corp.	1162	U. S. Industrial Tools	654
Oakite Products, Inc.	756	Valley Craft Products Company	535
Ohio Crankshaft Co.	160	Van der Mark N.V.	844
Oliver Machinery Company	106	Van der Rijn N.V., H. J.	844
Tinius Olsen Testing Machine Co.	265	Van Waters & Rogers, Inc.	221
Omark Industries, Inc.	1211	Walker-Turner Division	466
O'Neil-Irwin Manufacturing Company	535	Welch Tool Sales	1215
Pacific Coast Gas Association	416	Wells Manufacturing Corp.	587
Pacific Division, De Laval Separator Co.	102	Werkspoor, N.V.	844
Pacific Scientific Company	265	Wesco Tool, Inc.	815
Pacific Tube Company	366	Wesrep Corp.	1219
Parker-Kalon Division	1126	Western Automation, Inc.	1154
Partlow Corp.	265	Western Industry	1243
Peck-Lewis Corp.	811	Wheelco Instruments Div.	238
Perfect Gear & Instrument Corp.	720	S. S. White Industrial Division, Dental Mfg. Co.	1138
Phillips Electronics, Inc.	227	Wiedemann Machine Company	260
Phillips Manufacturing Company	441	Wilson Mechanical Instrument Div.	265
Picco Industries	524	Wirth Gas Equipment Company, C. R.	430
Pop Rivet Division	820	Norman S. Wright & Company	266
		Wyandotte Chemicals Corp.	628



BLACK & DECKER heavy duty portable nibbler is compact yet develops pressure of 2-ton punch press.



BUDD COMPANY Radac 302 shown here is one of a number of testing instruments firm will show.



CHAINVEYOR will display full size show conveyor in operation at their booth to show unit's versatility.

## EQUIPMENT AT THE SHOW

Asco Sintering Corp. will display a number of powdered metal filters, bearings, iron magnetic pole pieces and machine parts. Metal filters vary from minute discs up to elements 30-in. long and over 8-in. in diameter. Booth No. 566.

Black & Decker will exhibit and demonstrate 4 new electric tools: 8 gage heavy-duty portable nibbler; heavy-duty sabre saw; 2-speed reversible heavy-duty drills; 2-speed magnetic drill press. Booth No. 624.

Budd Co.'s Instruments Division will exhibit a number of testing machines including the Radac 440 and 302 multiple frequency non-destructive units; the Heat-check Model 910; Model TC22 digital strain indicator and Tatnall Model RL6 creep rupture testing machine. Booth No. 738.

Cable Distributors, Inc., will feature the line of Nicopress sleeves and tools for making splices in wire rope, that allow a user to make his own slings. Booth 1112.

Chainveyor Corp. is displaying a full-size show conveyor in operation. This overhead conveyor is designed to demonstrate extreme versatility through a wide range of horizontal and vertical curve sections ranging from 6-in. radii to 36-in. Booth 112.

Challenge Machinery Co. is showing for the first time a new lightweight aluminum straight edge and reversible black granite surface plates. Also on display will be a variety of surface plate equipment

including angle plates, box parallels and V-blocks. Booth No. 642.

Cobalt Information Center, Battelle Memorial Institute, will display samples of the varied uses of cobalt alloys and salts in industry, stressing particularly high temperature, magnetic, and wear-resistant applications. Booth No. 122.

Costello Engineering Corp. is featuring 2MR1 bending machine, a new compact machine designed for limited space use, yet providing quality and versatility. Booth No. 629.

De Laval Separator Co. will exhibit a self-opening separator for clarifying liquids with high solids content plus a coolant clarifier and a multi-purpose laboratory centrifuge. Booth 102.

The DeVilbiss Co. will give actual demonstrations of controlled 2-color spray painting demonstrating their new automatic airless spray gun and showing speed and versatility of airless spray methods. Booth No. 601.

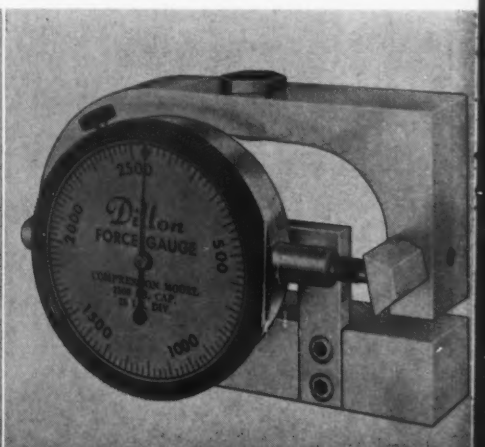
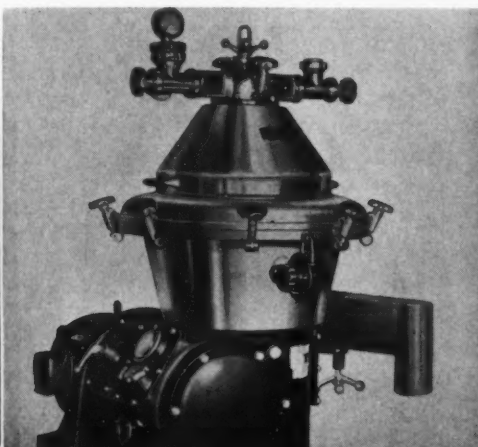
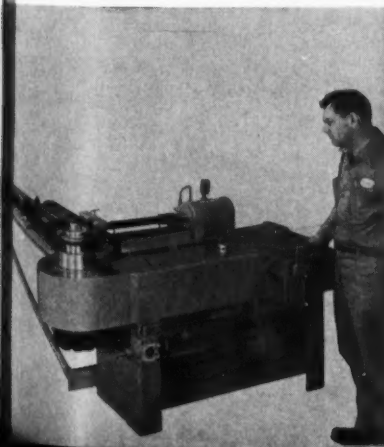
W. C. Dillon & Co. is showing its new line of electronic load cells used for checking static loads, weighing, production control and torque measurements. Also shown will be a line of Universal testing machines, hoist and crane scales, dial type thermometers, overload prevention devices for hoists and cranes and a line of traction type dynamometers. Booth No. 1116.

Ducommun Metals & Supply Co.'s booth will illustrate advantages of one-source buying for industrial purchaser. Shown will be complete display of carbon,

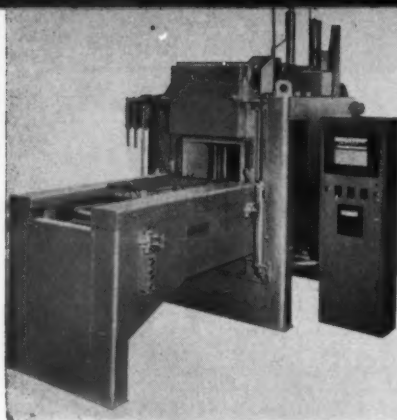
COSTELLO ENGINEERING is featuring a new 2MR1 bending machine with a capacity of 2-in. stainless pipe.

DE LAVAL's self-opening separator used for clarifying liquids with high solids content.

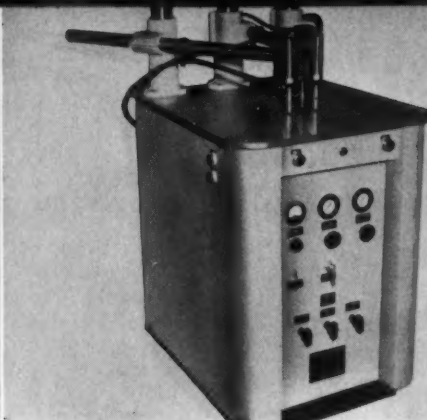
DILLON mechanical force gauge, model X-C gives precision measurement of compression, tensile or torque.



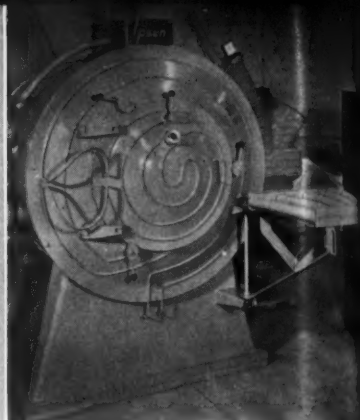




HEVI-DUTY Clean-Line heat treating unit is fully automatic from loading through quench.



KSM PRODUCTS model CD-100-1 capacitor discharge unit is for welding small fasteners to thin sheets.



IPSEN INDUSTRIES automatic high vacuum heat treating furnace, VFC-300, can be seen at their booth.

alloy and stainless steels, aluminum, brass, copper, tools, abrasives, and industrial supplies. Illustrating the special services that this firm offers will be full-color sound motion picture. Booth No. 334.

Engelhard Industries is exhibiting fine wires, precious metal salts, precious metal plating solutions, form roll, disposable thermocouples, silver brazing, and fluxes, and gas purifying equipment. Booth No. 242.

Harshaw Chemical Co. will show a new inexpensive gas chromatograph manufactured by Precision Scientific. Also shown will be a thin sectioning machine as well as latest improved design of instruments used in research and control laboratories. Booth No. 482.

Hevi-Duty Electric Co. is featuring a Clean-Line heat treating unit which is fully automatic from loading through quench. Booth No. 187.

Ipsen Industries, Inc., is exhibiting a new automatic, vacuum heat-treating furnace, Series V-300. Specially adaptable for copper and nickel brazing of flat stainless assemblies, unit incorporates many recently developed new features. Booth No. 159.

KSM Products, Inc., will feature the newest in arc and capacitor discharge stud welding equipment, including the new Model CD-100-1 capacitor discharge unit. Live demonstrations will be given of their stud welding gun, stud welding units, and power pack. Booth No. 863.

Leeds & Northrup Co. presents its first West Coast

exhibit of TEMENTIP expendable thermocouple cartridge, a portable millivolt potentiometer, a single point recorder and controller, a multi-point indicator, infrared multi-control system for atmosphere control of furnaces and generators and the Type K-3 potentiometer for laboratory use. Booth No. 678.

Lindberg Engineering Co. is exhibiting cut-away section of a pit type carburating furnace, a vertical floating zone scanner, an operating model of an induction furnace, a radiant wall gas-fired stationary crucible aluminum melting and holding furnace in operation, and a full scale working model of Autoladle for automatic ladling of aluminum and a model of an atmosphere controlled bottom quench gantry type heat treat furnace. Booth 342.

Magnaflux Corp. is featuring a number of non-destructive test systems including the Magnatest ED-517; a new portable ultrasonic thickness measuring machine, the Sonizon SO-300; an automatic eddy current sorting instrument; and an electronic instrument that measures elastic properties of materials. Booth No. 274.

Metal Improvement Co. will feature its expanded line of advanced wet blasting and blasting cleaning equipment and processes used in the metal treating and surface finishing fields, including new wet blast machines, a tumble-action blasting unit, two newly developed blasting nozzles, and parts treated with the Super-Rez coating process. Booth 182.

LEEDS & NORTHROP's TEMENTIP expendable thermocouple cartridge is shown for first time on West Coast.

LINDBERG radiant wall gas fired aluminum melting and holding furnace will be shown in operation.

MAGNAFLUX transistorized battery powered Sonizon SO-300 ultrasonically measures metal thicknesses.





# LOOK TO POWELL VALVES

For the largest selection of valves, look to Powell. This includes gate, globe, angle and check designs in bronze, iron and steel, as well as industry's widest selection of special alloys. And, Powell valves are specifically designed for water, oil, gas, steam, air and corrosive fluid applications . . . whatever you need!

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procedures. These combine to produce valves of the highest reliability, and at the lowest cost . . . you save through Powell performance on your job.

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*115th year of manufacturing industrial valves for the free world*

**POWELL STEEL VALVES**

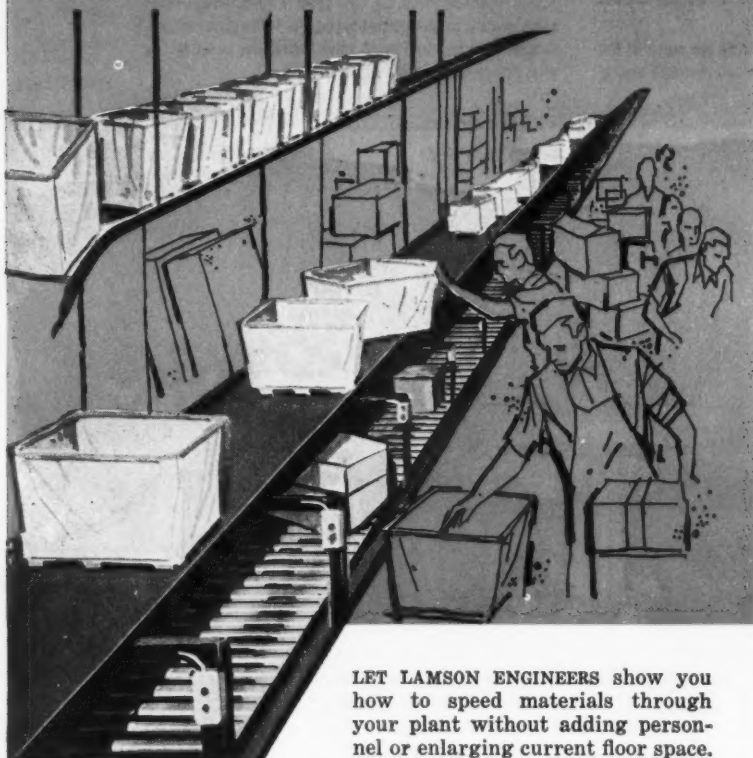
THE WM. POWELL COMPANY CINCINNATI 22, OHIO

*. . . for more details, circle No. 20 on Reader Service Postcard*



# LAMSON CONVEYORS

*when orders come in  
but can't get out...*



LET LAMSON ENGINEERS show you how to speed materials through your plant without adding personnel or enlarging current floor space.

Conveyor units alone are not enough. Units must be moulded into a conveying system designed to accomplish certain objectives. And, system efficiency depends on the expertness of system design.

Only high engineering skill plus long experience in materials handling can guarantee a successful operation. Both characterize the LAMSON record of achievement that goes back 80 odd years.

LAMSON engineers have become famous for providing "Turn Key Jobs" . . . a complete service that includes system design, component installation, user-personnel training, critical operational checks and the assumption of full responsibility.

So . . . if your orders are not hitting the dock on time, check LAMSON. For full information about LAMSON conveying systems, write to 106 Lamson Street, Syracuse, New York.



PIONEERS the Conquest OF INNER SPACE

## LAMSON CORPORATION

PLANTS IN SYRACUSE AND SAN FRANCISCO • OFFICES IN ALL PRINCIPAL CITIES

Manufacturers of Airtube® (Pneumatic Tube Systems) • Integrated Conveying Systems • Pallet Loaders • Selective Vertical Conveyors • Bookveyors® Clinical • Trayveyors® • Food Service Systems • Blowers and Exhausters • Exidust® Central Vacuum Cleaning Systems • Dryset® Air Vacuum Systems

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#### TAY-HOLBROOK, INC.

603 Brown St., Box 3038  
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940 Broadway, Eureka, Calif.  
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695 Stockton Ave., San Jose, Calif.  
Phone: CY 2-3606  
1800 Merced St., San Leandro, Calif.  
Phone: NEptune 6-1110  
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#### METAL SALES INCORPORATED

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#### COPPER AND BRASS INCORPORATED

Founded by Paul Revere in 1801

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side and Santa Ana, Calif.; New Bedford and  
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Sales Offices in Principal Cities.  
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WESTERN INDUSTRY/MARCH 1961

. . . for more details, adv. opp. pg., circle No. 22 on Reader Service Postcard →

# AGAIN-



## Revere helps "fit the metal to the job"

**AND A MAKER OF MEDICINE CABINET  
MIRROR FRAMES SAVES \$10,000 A YEAR**

As a result of a suggestion made by one of Revere's Technical Advisors, a maker of mirror frames for medicine cabinets has saved \$10,000 a year on polishing costs alone. The suggestion was that, by changing to a brass of different grain size, the manufacturer might be able to save money on polishing costs and at the same time improve the quality of his product. (The 90° bend to which the mirror frames are subjected also had to be taken into consideration.)

Samples were made using a Revere Brass Strip with a smaller grain size as recommended by the Technical Advisor. Tests showed that, as a result of the change the manufacturer was able to realize a saving of 17¢ per mirror frame on polishing costs alone, with no increased costs in other operations, including the 90° bend. Based on the saving per frame this manufacturer has saved \$10,000 per year for the past 4 years!

Here is still another example of how Revere's Technical Advisory Service working with the customer and the mill helped "fit the metal to the job," thus saving the customer money as well as improving product quality.

Why don't you take advantage of the extensive knowledge of Revere's Technical Advisory Service in "fitting the metal to the job?" It's entirely possible this service can save you money . . . help improve the quality of *your* product.



### **REVERE COPPER AND BRASS INCORPORATED**

*Founded by Paul Revere in 1801*

**Executive Offices: 230 Park Avenue, New York 17, N. Y.**

**SAN FRANCISCO: World Trade Center, Sutter 1-0282**

**LOS ANGELES: 6500 East Slauson Ave., Raymond 3-3331**

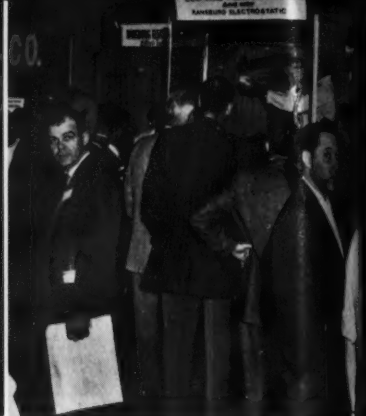
**SEATTLE: 314 Fairview - North, Main 2-1401**



MILWAUKEE ELECTRIC TOOL Sawzall is shown gang-cutting aluminum sheeting at speed of 3500 strokes per min.



MINNEAPOLIS-HONEYWELL new ElectroniK potentiometers use a four wire strain gage for rebalancing.



RANSBURG's electrostatic hand spray gun will be demonstrated at their booth along with continuous movies.

Milwaukee Electric Tool Corp. will demonstrate Model 6500 Sawzall heavy-duty hack saw, for fast sawing of metal; several new models of their drill line; a portable metal-cutting shear, weighing only 5 1/4 lb. yet cutting 17 gage stainless steel; heavy-duty sander-grinders, either 7 or 9-in. in diameter, and a new line of heavy-duty hole saws. Booth No. 467.

Minneapolis-Honeywell Regulator Co. display will feature their new ElectroniK 17 potentiometers that use a strain gage as a rebalancing element. Unit includes a strip and circulator chart recorder and circulator scale indicator to which electrical contact control can be added. Modulator construction allows interchangeability of components. Booth No. 125.

Norton Co. will show as its feature the newly announced 23 Alundum abrasive. Also shown will be diamond wheels for electronics industry, and abrasive wheels for portable foundry grinding. Booth No. 943.

Tocco Division of the Ohio Crankshaft Co. is displaying a 15 kw, 10 kc vertical, water-cooled motor generator set, together with a compact generator control panel and two heating stations. Also shown will be a 5 kw, 450 kc Toccotron and samples of various induction processed parts. Generator set and control panel will be operating. Booth No. 371.

Ransburg Electro-Coating Corp. will give live demonstrations of the new electrostatic hand spray gun, painting tubing completely with a gun spraying from only one side. Also shown will be automatic electro-

static spray equipment and continuous movies giving many industrial production painting applications. Booth 717.

Southwestern Engineering Co. is introducing for the first time their new Vibro-Energy finishing mills, designed to perform high efficiency polishing and deburring of metal, plastic, and ceramic parts by application of 3-dimensional vibratory motion. Booth No. 682.

Superweld Corp. is showing their Drive-Rivet system that eliminates need of driving a hole for the rivet shank prior to inserting and peening of the rivet. Booth No. 170.

Turco Products will feature new cleaning techniques for brazing stainless steel honeycomb structures and their Chem-Mill process for chemical milling of honeycomb cores. On display for the first time will be new Storm King Mark V steam cleaner. Booth 473.

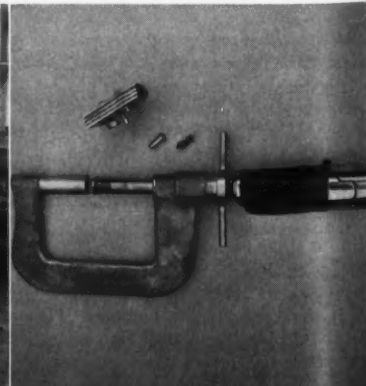
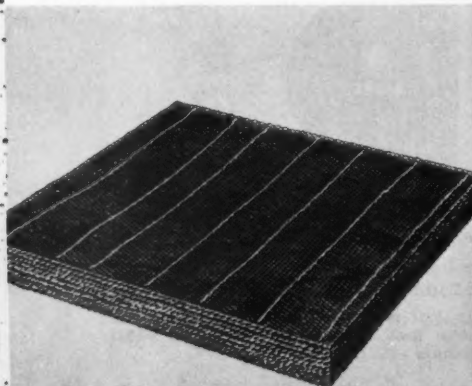
Turnkey Engineering Co. will feature a new H. R. Black automatic filter screen unit for removing contaminants from cleaning stages requiring filtration of spray washing, rinsing and treating solutions. Machine will be in constant operation at Booth 345.

Norman S. Wright & Co. will feature 2 new items by Research Products Corp. A new softer Neotex protective rubber mesh matting will be shown for protecting delicate highly polished or painted surfaces. Also shown will be paint arrestors, disposable air filters to trap overspray solids before they reach the exhaust stack. Booth No. 266.

RESEARCH PRODUCTS CORP.'s PR paint arrestors will be displayed in Norman S. Wright & Co. booth.

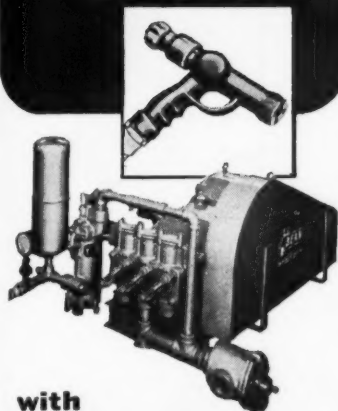
SOUTHWESTERN ENGINEERING is introducing for first time their new SWECO Vibro-Energy finishing mills.

SUPERWELD CORP. will have in operation their Drive-Rivet, a unique fastening tool eliminating drilling.





# Reduce Washing Costs



## with John Bean AQUABLAST High Pressure WASHERS



One man using AQUABLAST equals a crew of men using ordinary water pressure!

The fast, efficient cleaning made possible by John Bean High Pressure Aquablasting is saving industry thousands of dollars annually in clean-up costs. In just seconds, the hard hitting, super-cleansing Aquablast stream cuts caked dirt, hardened cement, gummy residues, accumulated grime and dozens of other hard-to-remove substances that previously required hours of scrubbing and scraping, or strong chemicals to wash away.

**SEND FOR COMPLETE INFORMATION ON 'AQUABLASTING' TODAY!**

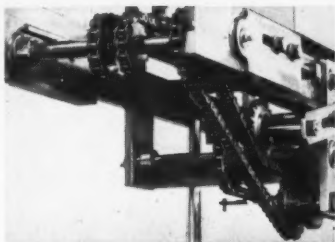


## INDUSTRIAL PUMPS

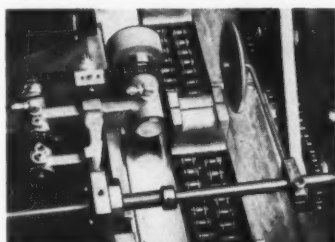
San Jose 1, Calif. Lansing 4, Mich. Dept. W1-6  
... for more details, circle No. 23

WESTERN INDUSTRY/MARCH 1961

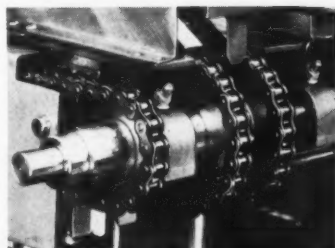
# WHAT'S THE ANSWER TO THESE 4 POWER TRANSMISSION QUESTIONS?



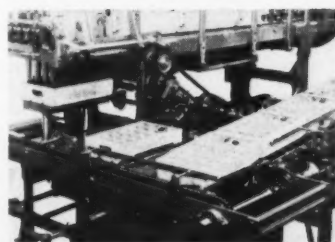
**1** Do I have at my disposal a complete line of quality power transmission products, scientifically made to give the longest life expectancy, free from replacement worries, at competitive prices?



**2** Will I be furnished with fast engineering service to solve my design problems and get the most efficient installations?



**3** Can I get off-the-shelf service and immediate delivery on all my requirements from an authorized local distributor who specializes in the handling of Acme Power Transmission Products?



**4** Will I receive the personal cordial attention of top executives thoroughly experienced in efficient use of roller chains with a willingness to help me with my engineering problems?

## THE ANSWER IS YES . . .

when you deal with Acme Distributors because they carry a complete line of Acme chains and are fully qualified to answer YES on all the important questions listed above. Call him for advice and service.



Write Dept. 2-C  
for new ill. 100 page catalog with engineering section.



## RELIABLE CHAIN DRIVES FOR ALL INDUSTRIES

ROLLER CHAINS, SPROCKETS, CONVEYOR CHAINS, FLEXIBLE COUPLINGS, ATTACHMENTS. (Special and Standard)

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# TERRIFIC!

**— and how long will the  
flexing member last?**

Good question. The heart of Para-flex is a tire with synthetic tension members bonded together in rubber—which provides a flexing body that automatically compensates for all combinations of misalignment and end float, and absorbs vibration as well!

This amazing coupling has now been used in American industry 4 years. Thousands are in operation—in steel mills, paper mills, oil fields, mines, quarries, chemical plants, everywhere—and in these 4 years, replacements of elements have been negligible.

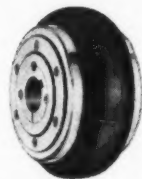
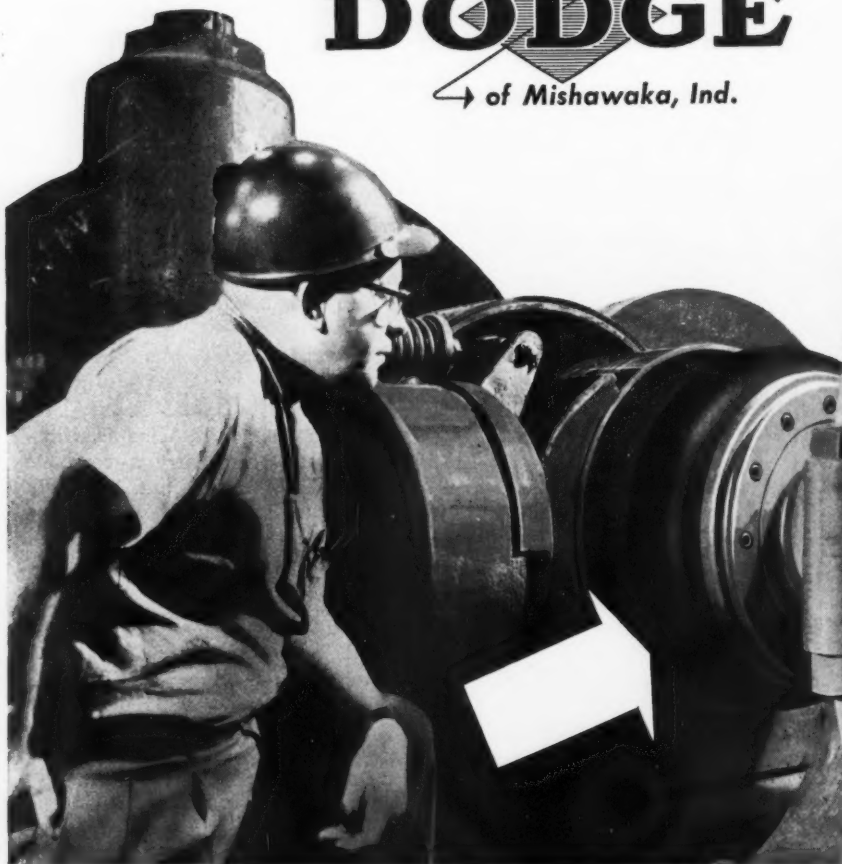
Dodge Standard Para-flex takes angular misalignment up to 4°, parallel misalignment up to 1/8" and end float up to 5/16" depending upon the size of the coupling and the duration of shaft displacement.

Dodge Para-flex is available in 3 types—Standard, Flywheel and High Speed (shown at right). The Standard type is stocked in capacities up to 3640 hp at 910 rpm. Ask your Dodge Distributor, or write us for complete technical bulletin.

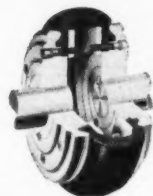
Dodge Manufacturing Corporation, 6600 Union Street, Mishawaka, Indiana

**The Products with the Pluses...**

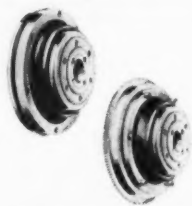
**DODGE**  
of Mishawaka, Ind.



The new idea in flexible cushion couplings, with a flexing member that "swallows up" misalignment.



No lubrication, no maintenance. Replace flexing element without moving driver or driven machine.

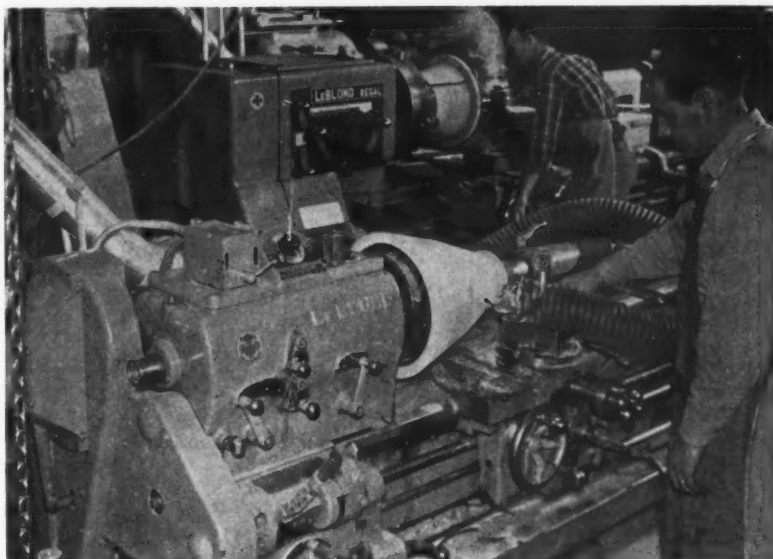


Flywheel and High Speed Types. For use with motors and internal combustion engines turning up to 5230 rpm.

**DODGE**  
**Para-flex**



**CALL THE TRANSMISSIONEER,**  
your local Dodge Distributor. Factory trained by Dodge he can give you valuable assistance on new cost-saving methods.



→  
**REINFORCED** plastic exit nozzle liner is machined to close tolerances after it has been compression molded at Dumont Manufacturing Corporation.

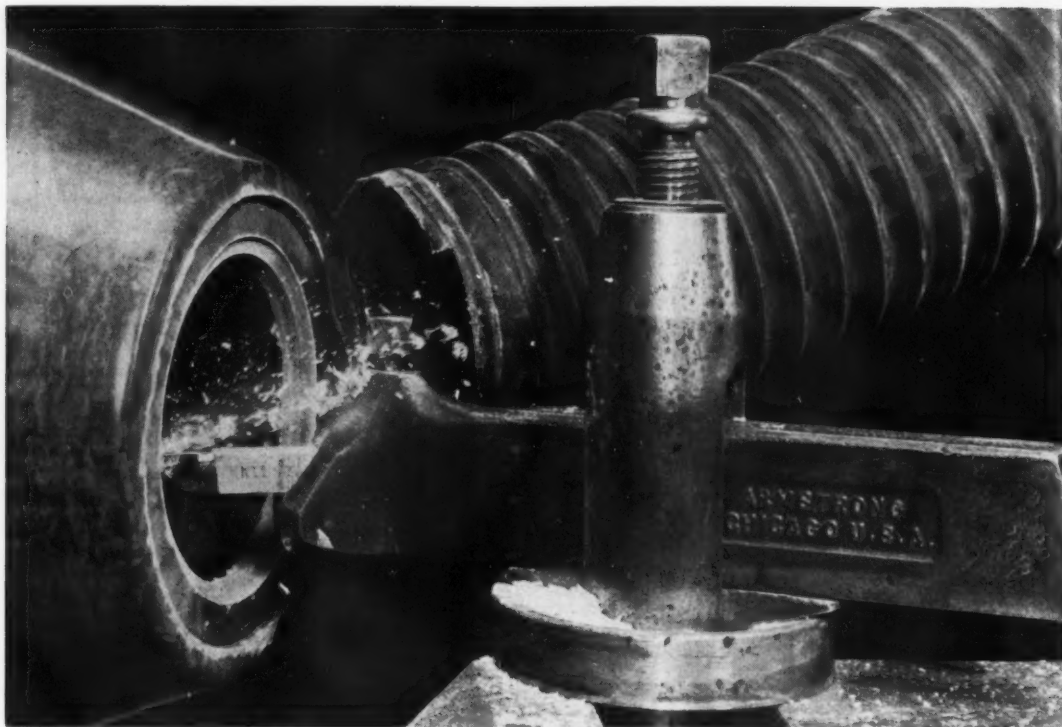
## SAFEGUARDS against abrasive plastics

Dry machining of abrasive materials calls for extreme preventive maintenance. This is how one Western firm solves the problem.

**A** PREVENTIVE MAINTENANCE program at the Dumont Manufacturing Corporation, subsidiary of H. I. Thompson Fiber Glass Co., San Rafael, Calif., protects workers from possible injury and reduces the excessive machine wear which could result from machining reinforced plastics. This company is the West's leading producer of ablative and insulative plastic components for the missile and rocket industry. Typical compression molded products include nose cones, rocket nozzles, blast tubes and engine closures. Such parts usually consist of

phenolic resins reinforced by fibers of glass, graphite, silica, quartz or asbestos, singly or in composite structures.

When the cured plastics are ground or turned, the dust and particles are extremely abrasive. And because of the close tolerances specified for missile components, it is vital that a tool's accuracy be maintained. All machining is done dry. It has been estimated that a lathe cutting just such plastics can wear more in a month, without adequate maintenance, than a lathe used only to turn metals will wear in a year.



*LARGE PERCENTAGE of reinforced plastic chips is drawn into exhaust outlet which is positioned as close to the carbide bit as possible.*

year. For that reason, every precaution is taken to minimize equipment damage and safeguard personnel. Between 80 and 90 per cent of the abrasive dust is removed by a central exhaust system and deposited in an enclosure outside the building. The system is a standard installation of the Reis Blowpipe Company and consists of a 10,000 cfm blower which feeds from twelve flexible rubber ducts. The suction outlet of each 4-in. hose is connected to a sheet metal termination adjacent to the cutting or grinding tool. In some cases, a special hood envelops the hose outlet to capture the bulk of the abrasive material.

It is the 10 to 20 per cent of the dust and particles not removed by the exhaust system that is responsible for the strictly enforced maintenance procedures to prevent undue machine wear. Older lathes are particularly susceptible to wear because they usually have soft metal ways, the carriage wiping systems are less efficient, gearing is less amply protected and headstock bearings are not equipped with improved type seals. Thus, the older the machine, the more care it requires.

**Grinding:** Grinding tools consist mainly of diamond-coated abrasive cutters of various shapes, diameters and sizes. The prime difference between grinding reinforced plastics and metals is that with the latter, the only abrasive particles come from the wheel itself. When plastics are ground, they produce a fine dust of their own that is infinitely more damaging to equipment. In addition, the particle size is smaller and the higher initial velocity of the particles leads to scatter-

ing. This makes complete dust removal difficult.

**Turning:** Although Dumont uses engine lathes for most of its machining because plastic missile parts ordinarily are conical or cylindrical, it has a wide range of other power tools for rough and fine finishing. Quite often, special tools must be designed and fabricated to machine parts of complex contours and configurations. Tungsten carbide tipped tool bits are used almost exclusively.

While the turning of plastics does not generate much dust, the cut produces small chips which can be troublesome if they are allowed to collect beneath the carriage. Since these chips are heavier, they usually are directed to the exhaust outlets by means of metal deflectors.

**Ways and Carriage:** To reduce dust and chip accumulations, ways are wiped off and blown down constantly. Lubrication is necessary but oil can't be used since it could combine with the plastics dust to create a grinding compound. This applies particularly to older machines. On newer lathes equipped with automatic oil systems, particles can be removed by flushing large quantities of oil under the carriage and out through the wipers. But this method is no cure-all because an abrasive emulsion still can result despite the volume of oil used.

Presently, the carriage is lubricated by wiping the ways with a carnauba-based commercial wax. Although this has proven to be the most effective lubricant for plastic machining service, graphite powder





*ABRASIVE PLASTIC* dust and chips falling on ways must be removed constantly to prevent build-up beneath carriage and possible galling.



and certain silicones also are being evaluated. The frequency of wax application depends upon the severity of the residual dust problem, but ways are coated at least once every 8-hour shift. Under extreme conditions, usually when quartz or silica fibers are machined, the carriage may need wax lubrication more often.

Despite all of the precautionary measures taken, it is possible that some abrasive dust will build up progressively under the carriage. Unless checked in time, the increased friction and uneven wear could develop pronounced gall lines. Each machine operator therefore is required to inspect ways and carriage frequently. When a carriage begins to drag excessively, and the cause is not inadequate lubrication of ways, the carriage must be lifted off and wiped out. This may seem to be a time-consuming procedure, but in the long run, it will save machinery. An accumulation of plastics dust can accelerate wear to a point which will lead to loss of accuracy first, and to an expensive

machine overhaul eventually.

**Seals:** Seals on headstock spindles are checked frequently for possible signs of approaching wear. Abrasive plastics dust can work around the chuck and actually grind down the seal lip. The loss of effective sealing could allow dust to enter the headstock and lead to damage of bearings and gears. Any headstock seal that begins to show wear—a black ring around the spindle close to the seal—is replaced immediately.

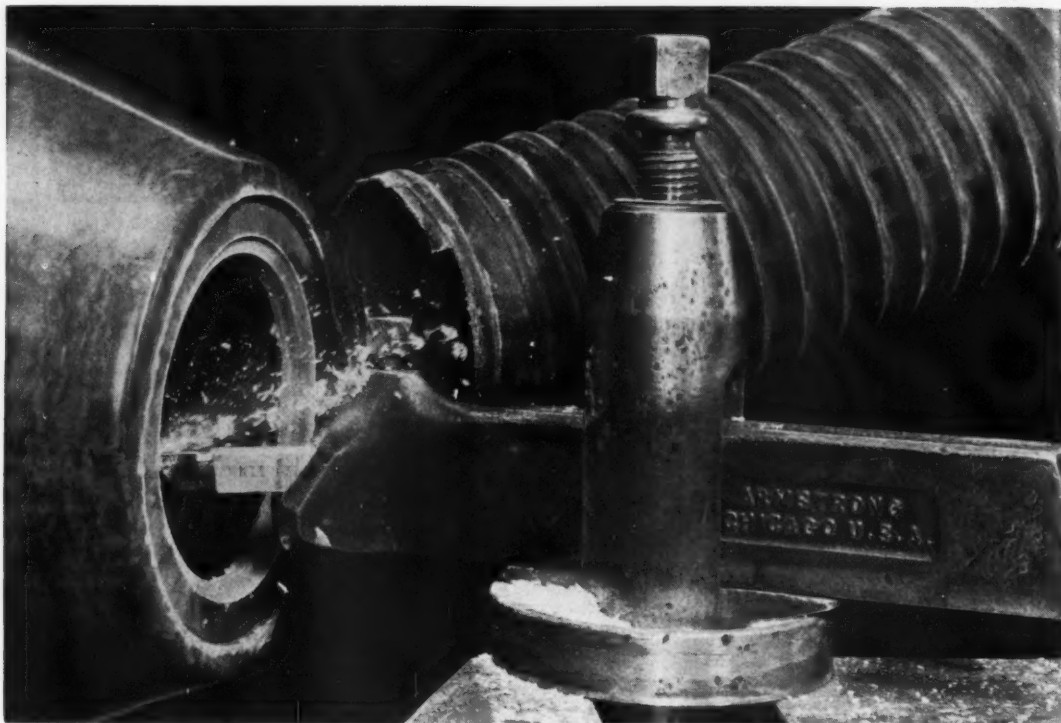
**Other parts:** While gearing wear is not as noticeable or as prone to damage as wear of ways, it is still a possible source of trouble and steps are taken to minimize it. Deflectors and various types of guards are used to keep abrasive dust out of the cross-feed and compound mechanism and the apron with its associated gearing.

The results of this preventive maintenance program have been manifested by the excellent condition of Dumont's grinding and turning tools despite a work schedule of 3 shifts daily.



*CARRIAGE AND WAYS* of lathes are lubricated with paste wax at least once every shift. Strict maintenance keeps equipment in excellent shape.





**LARGE PERCENTAGE** of reinforced plastic chips is drawn into exhaust outlet which is positioned as close to the carbide bit as possible.

year. For that reason, every precaution is taken to minimize equipment damage and safeguard personnel. Between 80 and 90 per cent of the abrasive dust is removed by a central exhaust system and deposited in an enclosure outside the building. The system is a standard installation of the Reis Blowpipe Company and consists of a 10,000 cfm blower which feeds from twelve flexible rubber ducts. The suction outlet of each 4-in. hose is connected to a sheet metal termination adjacent to the cutting or grinding tool. In some cases, a special hood envelops the hose outlet to capture the bulk of the abrasive material.

It is the 10 to 20 per cent of the dust and particles not removed by the exhaust system that is responsible for the strictly enforced maintenance procedures to prevent undue machine wear. Older lathes are particularly susceptible to wear because they usually have soft metal ways, the carriage wiping systems are less efficient, gearing is less amply protected and headstock bearings are not equipped with improved type seals. Thus, the older the machine, the more care it requires.

**Grinding:** Grinding tools consist mainly of diamond-coated abrasive cutters of various shapes, diameters and sizes. The prime difference between grinding reinforced plastics and metals is that with the latter, the only abrasive particles come from the wheel itself. When plastics are ground, they produce a fine dust of their own that is infinitely more damaging to equipment. In addition, the particle size is smaller and the higher initial velocity of the particles leads to scatter-

ing. This makes complete dust removal difficult.

**Turning:** Although Dumont uses engine lathes for most of its machining because plastic missile parts ordinarily are conical or cylindrical, it has a wide range of other power tools for rough and fine finishing. Quite often, special tools must be designed and fabricated to machine parts of complex contours and configurations. Tungsten carbide tipped tool bits are used almost exclusively.

While the turning of plastics does not generate much dust, the cut produces small chips which can be troublesome if they are allowed to collect beneath the carriage. Since these chips are heavier, they usually are directed to the exhaust outlets by means of metal deflectors.

**Ways and Carriage:** To reduce dust and chip accumulations, ways are wiped off and blown down constantly. Lubrication is necessary but oil can't be used since it could combine with the plastics dust to create a grinding compound. This applies particularly to older machines. On newer lathes equipped with automatic oil systems, particles can be removed by flushing large quantities of oil under the carriage and out through the wipers. But this method is no cure-all because an abrasive emulsion still can result despite the volume of oil used.

Presently, the carriage is lubricated by wiping the ways with a carnauba-based commercial wax. Although this has proven to be the most effective lubricant for plastic machining service, graphite powder

→  
*ABRASIVE PLASTIC dust and chips falling on ways must be removed constantly to prevent build-up beneath carriage and possible galling.*



and certain silicones also are being evaluated. The frequency of wax application depends upon the severity of the residual dust problem, but ways are coated at least once every 8-hour shift. Under extreme conditions, usually when quartz or silica fibers are machined, the carriage may need wax lubrication more often.

Despite all of the precautionary measures taken, it is possible that some abrasive dust will build up progressively under the carriage. Unless checked in time, the increased friction and uneven wear could develop pronounced gall lines. Each machine operator therefore is required to inspect ways and carriage frequently. When a carriage begins to drag excessively, and the cause is not inadequate lubrication of ways, the carriage must be lifted off and wiped out. This may seem to be a time-consuming procedure, but in the long run, it will save machinery. An accumulation of plastics dust can accelerate wear to a point which will lead to loss of accuracy first, and to an expensive

machine overhaul eventually.

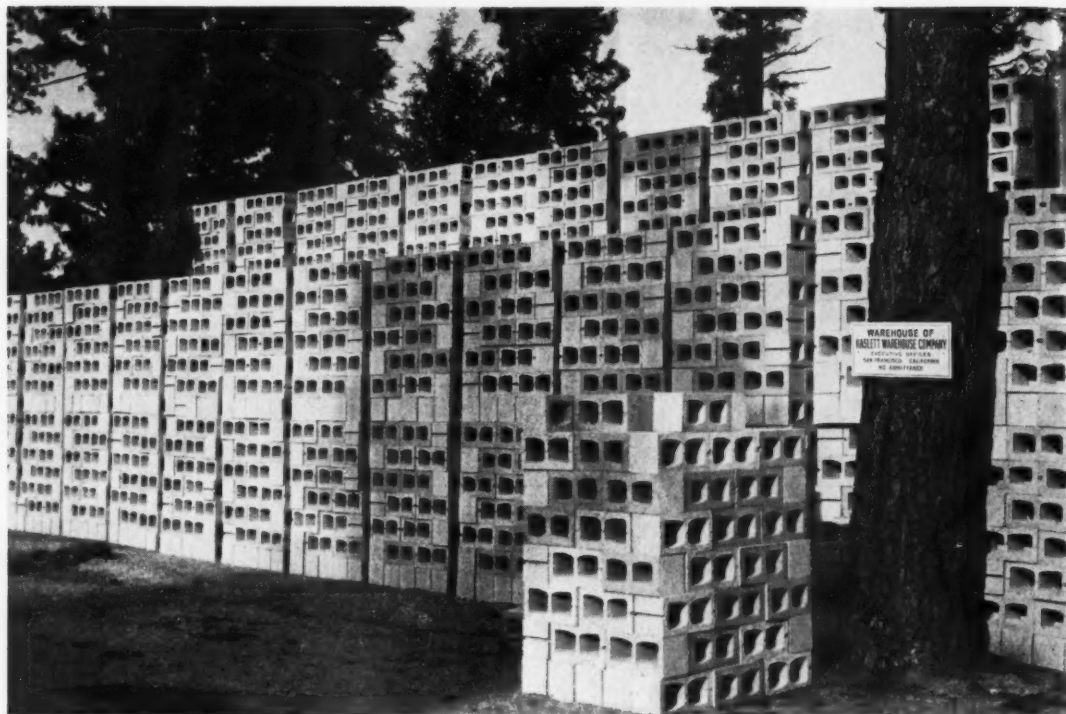
*Seals:* Seals on headstock spindles are checked frequently for possible signs of approaching wear. Abrasive plastics dust can work around the chuck and actually grind down the seal lip. The loss of effective sealing could allow dust to enter the headstock and lead to damage of bearings and gears. Any headstock seal that begins to show wear—a black ring around the spindle close to the seal—is replaced immediately.

*Other parts:* While gearing wear is not as noticeable or as prone to damage as wear of ways, it is still a possible source of trouble and steps are taken to minimize it. Deflectors and various types of guards are used to keep abrasive dust out of the cross-feed and compound mechanism and the apron with its associated gearing.

The results of this preventive maintenance program have been manifested by the excellent condition of Dumont's grinding and turning tools despite a work schedule of 3 shifts daily.

→  
*CARRIAGE AND WAYS of lathes are lubricated with paste wax at least once every shift. Strict maintenance keeps equipment in excellent shape.*





*SMALL PORTION of the total Glass Mountain Block inventory, stored outside close to the plant, is shown. This inventory though it never left plant site is controlled by Hazlett Warehouse Co., note sign posted on tree. Firm can now borrow needed capital for expansion on inventory.*

## FIELD WAREHOUSING

### a tool for western industrial expansion

Unique system permits borrowing on inventory, which remains in the plant and under third party control. Inventory withdrawals and additions can be made.

**R**APID INDUSTRIAL GROWTH and need for expansion has created a problem for many Western manufacturers. The capital investment necessary for new machinery, larger inventories, more outlets is beyond the resources of their accumulated earnings. One source of obtaining additional needed funds is by borrowing on inventory. To do this and still allow the firm to function effectively from day to day a system called field warehousing has been developed.

Contrary to its name field warehousing does not require transport of inventory to a centrally located public warehouse building. It is, instead, a method

of acquiring more working capital through the issuance of warehouse receipts for inventory stored on a manufacturer's premises but under the control of a qualified third party, a company that specializes field warehousing.

An example of how this method can effectively satisfy the requirements of the lender and at the same time allow the borrower company to function effectively is found in the case of Glass Mountain Block, Inc. This cement block plant is located in Modoc County, California, 28 miles south of Tule Lake and close to an excellent, though isolated, source of supply of pumic aggregate. It was founded in 1947 by



→  
**PLANT BUILDING** houses block machine with 10,000 blocks per day capacity, reputedly largest and fastest of its kind on West Coast. Note fork lift truck taking pallet load of blocks to be added to inventory.



Niilo Hyytenin and has increased in size over the years. In 1957 and 1959 sales yards were opened in Klamath Falls, Oregon, and Reno, Nevada, and a block machine installed with a capacity of 10,000 blocks per day.

Production at this rate constantly called for more kilns for curing, more transport, greater sales efforts, larger inventories, all vital to expansion but consumers of capital at a rapid rate.

With this need for increased capital, in 1960 Hyytenin went to his bank in Dorris, California. Conferences there resulted in the decision to make use of field warehousing and Haslett Field Warehousing was called in.

One requirement necessary to Glass Mountain's business is to maintain a large inventory of concrete blocks both for rapid service and to allow for the necessary curing time. The inventory remained exactly where it was, in the storage yard of the Glass Mountain plant. Haslett personnel made a careful inventory and the blocks were placed under their control.

After the initial inventory, Haslett trained and bonded a Glass Mountain employee. He was paid by Haslett and placed in full charge of the inventory. They posted Haslett Warehouse Company signs conspicuously around the entire yard and issued warehouse receipts for the inventory.

The bank then provided Hyytenin with the necessary capital, holding the Haslett warehouse receipts as their security. On a pre-agreed schedule, concrete blocks are released from the field warehoused inventory as sales are made. As new inventory is added it, in turn, is available for additional borrowing.

Complete reports of all entries and withdrawals and a perpetual inventory status report are prepared regularly on electronic business machines and rendered to both Hyytenin and the bank by the warehouse company.

Thus Glass Mountain's inventory of concrete blocks remains in its own storage area free for shipment as orders come in, the bank has an excellent loan, and Hyytenin has the needed working capital to expand his business.



**OWNER OF Glass Mountain Block, Inc., discusses order with customer. Feature of field warehousing method is that inventory under third party control can be used for sales and can be added to.**

## STRAPS AND BUCKLES have industrial handling uses

Here is a fast, inexpensive, flexible method of securing parts and equipment handled.

**S**TRAP AND BUCKLE EQUIPMENT is finding increased application in industrial material handling as an efficient, flexible method to tie down parts and equipment for short in-plant movement or for longer outside hauls. These cargo control systems can be used on shop dollies, can be attached to the mast of fork trucks to prevent tipping of bulky cartons, or can be used as closure for packaging if high reusability is required (WI, Sept. 1960, p. 42).

Schlumberger Well Surveying Corp., with West coast offices in Los Angeles and Long Beach, Calif., needed a tie down system for long, heavy cylinders in the bed of a pickup truck. The cylinders contained electronic oil well logging tools and perforating guns, each worth hundreds-of-dollars and so delicate that each item had to be secured to the truck separately.

An installation of series E retrofit track and fittings combined with a ratchet buckle and nylon webbing assembly made by General Logistics Div., Aeroquip Corp., Burbank, Calif. was installed without modification to the truck bed and offered the tools a gentle ride.

Two lengths of 2674-1 track were mounted across

the truck bed about four feet apart and rings were attached at each end of the tracks. The free end of the ratchet buckle assembly was secured through one ring with a hook and keeper.

Eight fittings were attached to the webbing so that they could slide freely along the strap until they fit snugly against the circular-shaped tools and could be secured in slots in the track. The ratchet buckle was hooked to the other ring and when operated would draw webbing tightly over each tool.

Rated strength of the track, made from 11 gage 1010-1020 hot rolled steel, is 1000 lbs. It weighs only 32 ounces per running foot and is fitted with mounting holes spaced on 2-in. centers. Fittings and the ratchet buckle are made from cadmium-plated steel.

The buckle acts as a miniature winch. An operator with one hand can crank up the tension in the webbing and when the load is secure can push the handle into a positive locking position.

Quick release is accomplished by pressing a release bar and pulling back the handle. Webbing is instantly released and the free end prevents workers from accidentally tripping.



*OPERATOR USES HANDLE on ratchet buckle to crank up slack in webbing. Fittings hooked into rail on each side of cylinders hold webbing in snug loop.*



*FREE END of strap assembly is secured through ring. Note eight free sliding fittings, center, that fit into slots in the rail.*

## DO IT YOURSELF computer service

Los Angeles firm offers new production tool to small plants. Idea is similar to laundromat.

**E**MPHASIZED DURING DISCUSSIONS at this winter's American Society of Tool and Manufacturing Engineers in Los Angeles was the growing need for automated machine tools, especially for the small firm. It was felt that this segment of industry, including the bulk of Western subcontractors, might need to automate in order to remain in the business of rapidly producing close tolerance items for increasingly cost conscious prime contractors and other industrial customers.

In addition to automation of machine tools, consensus was that engineering and design time would have to be shortened in the small plant. The computer was offered as an ideal time saver. Since this is an expensive and hard-to-justify production tool for all but the largest concerns, it was suggested that a localized computer service might offer the small firm engineering aid at reasonable cost.

Backing this concept were a number of job shop operators who said that they might automate their machine tools if they could produce programming more cheaply than by computing tool cuts with slide rule and desk calculator and then manually punching a tape.

Less than 90 days after the conference the first of these once theoretical help yourself computer centers has opened in Los Angeles. Called a Computermat, it is offering machine time on a self service basis under direction of Hy Kolkowitz, president. Basic hardware for the operation is an IBM 1620 system built specifically for engineering and design computation and readily adaptable to the IBM AUTOMAP program for numerical control of machine tools.

The 1620, all transistorized, is a decimally operated core memory computer that is ideally suited to the self-service concept because of high reliability, ease of operation—even for the inexperienced—and low operating cost, Kolkowitz said.

He described the service offered as comparable to the ubiquitous laundromat. "We operate the same way a laundromat does," Kolkowitz observed. "We provide the necessary equipment and allow the customer to do his own work."

Kolkowitz, like his staff members, is an engineer



*CHECKING AUTOMATIC tape punching apparatus, Kolkowitz prepares to run a checkout test of all the machine's functions. At the end of the test the printer will read out a message indicating "the state of health" of the computer. Such a check is a matter of course at the beginning of a day.*

with a background in application of computers in solving engineering problems. They offer help if needed and hope to attract engineering personnel from companies without the volume necessary to support their own computer installation.

There are more than 1000 Los Angeles firms alone, Kolkowitz estimates, that are engaged in engineering and technical activities that could be aided by fast computerized solutions.

Turning to tape production, he described the AUTOMAT system that can be used for numerical controls that will hold  $\pm .0002$ -in. "The beauty of this system is that no knowledge of programming or higher math is required. Any technician who can read a blueprint can make a tape in a few hours," Kolkowitz said.

The technician after reading the blueprint converts the dimensional data into AUTOMAP notations that might read as follows.

Operation	Notation	Position or Dimension
Cut straight line	STRA	0,1 2,3
Mill Circle	CIRL	1,0 5.7 (in.)

The information fed into the 1620 will enable it to determine cutting points for a straight line bounded by the two points, 0,1 and 2,3 in the XY plane and for a circle centered at 1,0 and with a 5.7-in. radius. Additional input includes cutting tool radius, tolerances, machine stopping points.

When all this data has been converted into AUTOMAP notation, it is punched into paper tape and fed to the 1620. The computer acts upon the input tape and generates a machine control tape that provides instructions for each position or motion of the milling machine cutting tool.

## RAPID REPLACEMENT of machine tools

This precision metalworking shop saves maintenance costs, gets top resale price by frequent machine tool turnover.

**O**F GROWING IMPORTANCE in the West are smaller job shops serving as vendors for larger firms to handle their close dimensional short run production. Many job shops in this field have more specialized high accuracy machine tools on their floors than the prime does.

Typical of this type of vendor is Edgcomb Engineering & Engraving Co., a Burbank, Calif. vendor-firm that according to its owner, Robert A. Edgcomb, deals in "production headaches". Example, a tiny refractory metal part for a vacuum tube made from Tantalum and so intricately machined that its price in 100 lots is \$26.00 each.

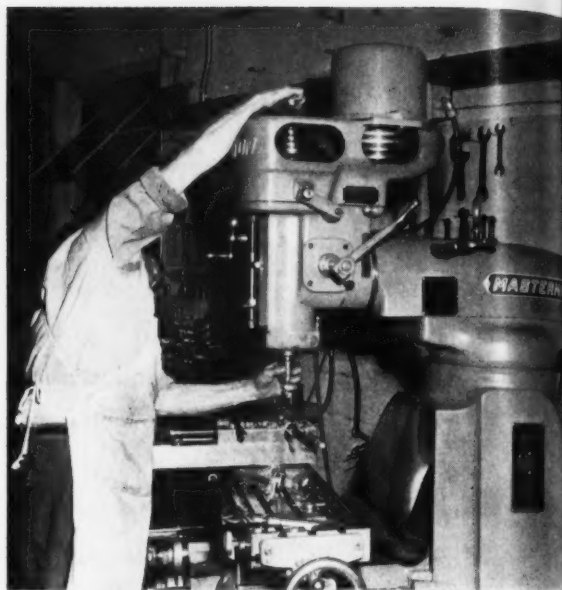
Edgcomb specializes in extremely close tolerance machining, cam milling, 2 and 3 dimensional profile milling, precision graduating, circular and linear with accuracies of 20 seconds. He uses Gorton, LeBlond, Hardinge, South Bend, Cincinnati, DoAll, and Kearney & Trecker machine tools among others.

Good men and machines are a must for such production, he says. Edgcomb finds that his workers will stay longer in a well equipped shop and will produce better work faster on new or well maintained machines.

"Every nick in a machine hurts," Edgcomb says. If the machine is unmarked the machinist is inclined to take better care of it and upgrade his performance. If a machine has half a dozen nicks, one more doesn't seem to matter, he observed.

To implement his rather unusual program of maintaining mint condition machine tools and his philosophy of employee stability, Edgcomb turns over most of the machine tools on his floor within a quick two to three years. He rarely waits four or five years. With 33 major pieces on his floor he maintains a constant replacement program and for such a small firm, a rather unusual relationship with representatives of the machinery market.

Edgcomb depreciates his machine tools on a 16-year schedule. Overall value of his inventory drops at about  $\frac{1}{2}$  of 1% monthly. This is used to determine the selling price of his used machines. Edgcomb sets the price himself, does not depend on "bluebooks" or dealer estimates and because of his reputation for outletting



*A VISIBLE EXAMPLE of the condition of machine tools at Edgcomb is this literally spotless Gorton Masternil model 1-22. This machine may move out for replacement in as little as two years under current program. Repair or maintenance costs are negligible.*

well maintained "young" machine tools he says he invariably gets it.

He works in two ways. He is either solicited by machine tool people who know of firms needing a piece of quality machinery but without funds to purchase new, or Edgcomb alerts machine tool reps as soon as a tool is scheduled for replacement.

Edgcomb does not have any formalized time table for replacement. Since he replaces an "old" machine with an identical or modified new version, he rarely bases replacement on poor performance or economy.

He finds enough demand for his used items so that firms will compete pricewise to obtain his machines, an unusual happening in the current Western used machinery market.

This rapid replacement is an economy, he says, despite variance in purchase and resale price that averages over \$1500.00 a machine. Savings are realized in production time cutting and in almost complete avoidance of repair and maintenance costs.

As a matter of policy when funds are available or projected work makes it a good investment, additional funds are allocated to obtain the latest refinements in the replacement item, even if they are not yet available. An ASTM official and inveterate machine tool show addict, Edgcomb often has his order in long before the manufacturer has sent any items to the distributor.

His philosophy must pay off. With many of his competitors having a slow season, a survey of time cards shows his men averaging a 55-hour week.





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# WESTERN STATES Industrial Distributors Conference

NIDA held its Western States Conference in San Francisco on February 12-13. Here are the highlights of that meeting.

**S**OME 300 distributors, manufacturers and guests met in the Fairmont Hotel, San Francisco, on February 12-13 at the annual Western States Conference of the National Industrial Distributors Association.

On Sunday, February 12, the conference opened with registration, a luncheon and a business meeting for distributors. These were followed by a reception for distributors, manufacturers and their wives.

Monday, February 13, was the general business session. It started at 9:00 A.M. and attendees heard opening remarks by Miles I. Stray, President, NIDA, and Samuel D. Conant, President, American Supply and Machinery Manufacturers Association, Inc. A series of speakers then discussed business conditions throughout the Western states. While the West has felt the business slack, it does not appear to have felt it as much as in the East and in some areas such as Northern California, distributors are optimistic as to the future.

Distributors heard John Vance of McKinsey & Co. speak on "Where is the Distribution System Heading," and in the afternoon session the Honorable Goodwin Knight addressed the assembly. He was followed by Wallace Campbell of Campbell Industrial Supply Co., who discussed "Trade Pressures from South of the Iron Curtain."



**WAYNE RISING**, Senior Vice President, Ducommun Metals & Supply Co., discusses the Western States Industrial Distributors Conference with **Robert Fernley**, Executive Secretary, NIDA.



**CHARLES J. BETZ** (left), Manager, Outside Sales, SPS, talks to **Lewis Johnston** (right), West Coast Manager for Standard Pressed Steel Co.



**ALLEN B. HUGHES**, District Manager, Bay State Abrasive Products Co., chats with **E. A. Law** of Republic Supply Co. of California, a distributor of Bay State products.

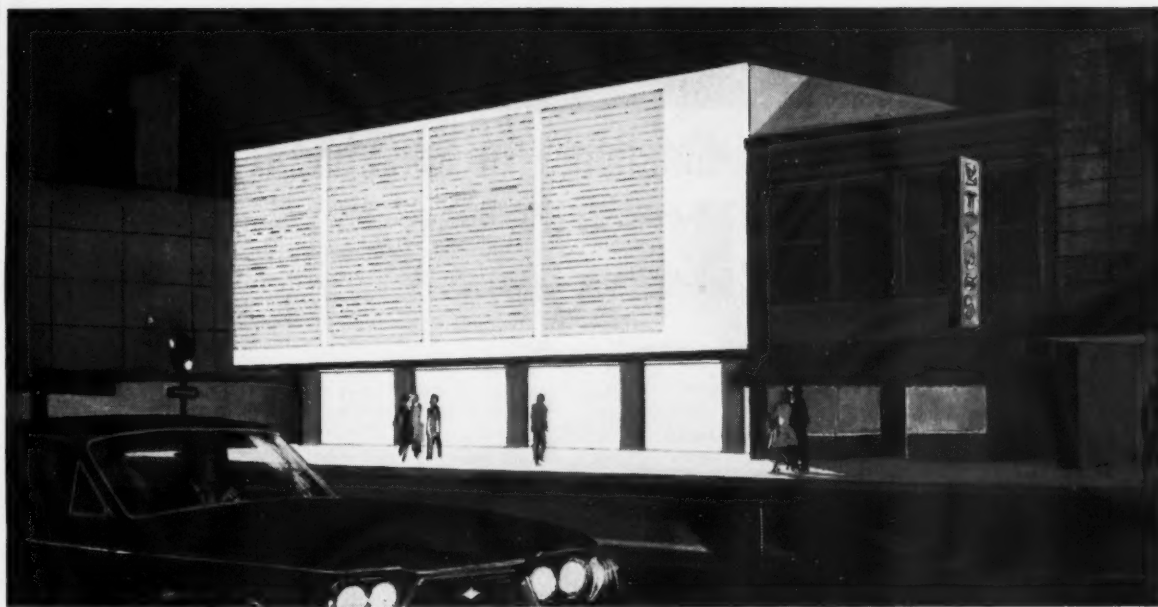


**SEEN AT THE** Western States Industrial Distributors Conference are, left to right: **Albert A. Hally**, Vice President, Marketing, Campbell Chain Co.; **Miles F. Alexander**, General Manager, The A. J. Glesener Co., Inc., a Campbell distributor; **Leonard Woods**, and **Gerald T. Knott**, District Managers in the West for Campbell Chain Co.

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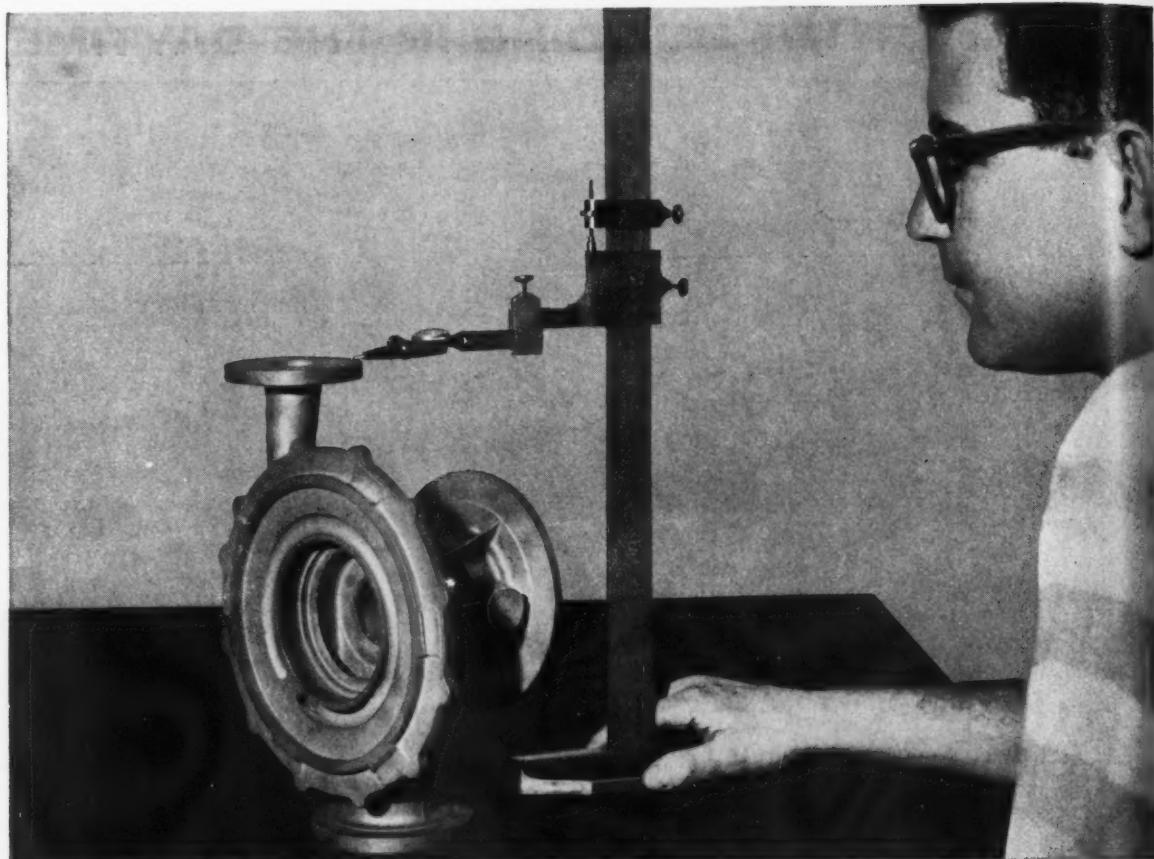
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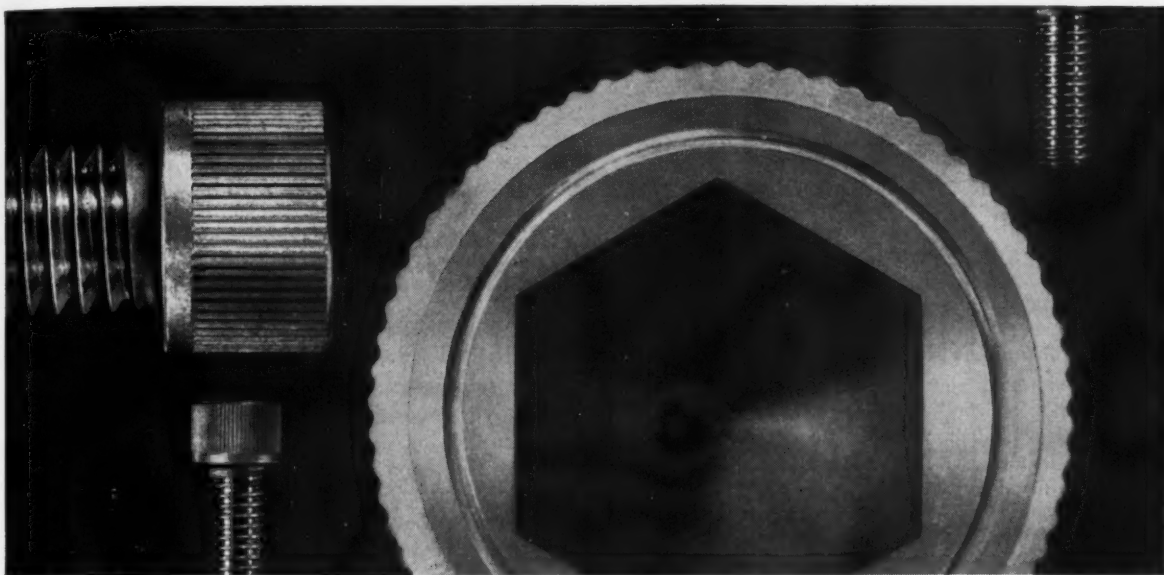
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WESTERN INDUSTRY/MARCH 1961



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TYPICAL MECHANICAL PROPERTIES UNBRAKO KS 812 Stainless Socket Head Cap Screws			
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UNBRAKO KS 812 socket screws offer high corrosion resistance over a wide range of applications and are serviceable from -300° to 800°F. Available in sizes #8 to 3/8 in., coarse or fine thread. See your UNBRAKO distributor or write Standard Pressed Steel Co. for new Bulletin 2734. INDUSTRIAL FASTENER DIVISION, SPS, JENKINTOWN 47, PENNSYLVANIA.

\*proper Head design (1960 series—standard on all UNBRAKO socket head cap screws, as is Hi-Life thread)



## SPECIAL MANUALS

FOR YOUR FREE COPY, CIRCLE APPROPRIATE KEY NUMBERS ON POSTCARD, p. 91

### METALS AND METALLURGY

#### Steel and Aluminum Handbook

Thumb-indexed, pocket-sized 224-page handbook lists sizes, shapes, weights, qualities and gives brief descriptions of steel and aluminum in stock. Also includes information about service on industrial plastics and metal fabricating machinery. *Joseph T. Ryerson & Son, Inc.*

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#### Data on High-Temperature Alloys

Seventeen leading alloys are compared against each other in the areas of physical, mechanical, and chemical properties, and stress-rupture data in this ready reference booklet. Charts show selected properties for each alloy at specific temperatures. Data cover the alloys in various forms, such as sheet, bar, sand- and investment castings. *Haynes Stellite Co., Div. of Union Carbide*

... FOR YOUR COPY, CIRCLE NO. 101

#### Alloys for the Electrical, Electronic Industry

Technical handbook is a basic guide to metals for electrical and electronic products. Covers the advantages and uses of phosphor bronze, nickel, Monel, Inconel, nickel silver, stainless steel and nickel-clad copper. *Riverside-Alloy Metal Div., H. K. Porter Co., Inc.*

... FOR YOUR COPY, CIRCLE NO. 102

#### Stainless Steel, Chromium Types

This 40-page manual is devoted to martensitic group and ferritic group of stainless steels in firm's 400 series. Covers types, corrosion resistance, properties of stainless at high and low temperatures, fabricating, joining methods, heat treating, care in fabricating and finishing, forms and finishes, and a table of mechanical and physical properties. *Republic Steel Corp.*

... FOR YOUR COPY, CIRCLE NO. 103

#### Continuous Cast Bronze Bars

Brochure devoted to the advantages of using continuous cast copper alloy rods, tubes and shapes in cutting waste and providing a uniform product. Covers dimensional tolerances and lists sizes and approximate weights of cored and solid bar. Tabulates physical properties and lists results of impact tests. *Kingwell Bros., Ltd.*

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#### Special Steels for Designers

Booklet contains reasons for designing with stainless steel, covering features of strength, easy fabrication, corrosion resistance and appearance. Describes high strength steels for longer equipment life and weight reduction; "T-I" constructional alloy steel, its mechanical properties and welding data; and special steels for special jobs. *U. S. Steel.*

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#### Stainless, Special Purpose Alloys

Booklet contains information on selection and properties of stainless steels. Also includes a description of alloys available for electronic, magnetic and electrical applications, and alloys for elevated temperature service. *Carpenter Steel Co.*

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#### Machining Stainless Steels

Pocket-size slide chart gives information on how to machine the popular grades of stainless. Includes concise data on turning, drilling, tapping, threading, milling and reaming operations. The chart tabulates feeds and speeds, and gives special notes on drilling, tapping, lubrication and welding. Also shows relative workability of stainless steels in a wide variety of operations. *Carpenter Steel Co.*

... FOR YOUR COPY, CIRCLE NO. 107

#### Aluminum Handbook

This 222-page hardback manual opens with a discussion of aluminum, its forms, alloys and tempers. Contains complete tabular data on wrought alloys; sheet and plate; wire, rod and bar; extrusions; tube and pipe; electrical conductor; structural shapes; forgings and casting alloys. *Aluminum Co. of America*

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#### Specialty Metals

Bulletin contains descriptive and tabular information on cold finished carbon steel bars including outstanding characteristics, average mechanical properties and machinability ratings. Data on stainless steels covers chemical analysis and mechanical properties of standard types. Presents a comparison of alloy steels; discusses heat treating and hardness testing. *Republic Supply Co. of California*

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Vancouver

### **Cold Drawn Steel and Welded Tubing**

Catalog describes materials, chemical composition and size limits of line of carbon and alloy steel tubing, stainless steel tubing and electric resistance welded steel tubing. Also covers material selection and applications. Additional sections are devoted to shaped tubing, small diameter specialty tubing and custom tube and bar manufacture, finishes, special inspection and test data. *Pacific Tube Co.*

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### **Machining of Nylon**

Technical handbook covers machining operations and procedures for nylon. Discusses turning, boring, milling, sawing, drilling and polishing of the material. Lists applications in which nylon is recommended with particular emphasis on bearings and other moving parts. *Bunting Brass and Bronze Co.*

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### **Abrasive Belt Machines for Metalworking**

Brochure sets forth specifications of a series of abrasive belt machines for the metalworking and the woodworking industries. Discusses advantages in high-speed, in-line production finishing of stainless, aluminum and other metal sheets and in wide surface deburring. *Carborundum Co.*

... FOR YOUR COPY, CIRCLE NO. 112

### **Machinable Carbides**

Manual is devoted to a machinable steel-bonded carbide. Includes a description of the machinable carbide; typical tooling problems solved with this material; complete machining and heat-treating instructions; and a listing of physical properties and stock sizes. *Sintercast, Div. Chrom-alloy Corp.*

... FOR YOUR COPY, CIRCLE NO. 113

### **Steels for Low Temperature Applications**

This booklet provides designers with information pertaining to the economical application of carbon, alloy and stainless steels which possess desirable metallurgical characteristics for low temperature service. Contains wealth of engineering data. Well illustrated. *U. S. Steel.*

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### **Story of Cold Finished Steel Bars**

This 68-page booklet is intended as a reference text to assist the steel warehousing industry in the technical education of personnel. Engineers and others engaged in the manufacture and use of steel will also find the material in this book helpful as well as interesting. *Bliss & Laughlin.*

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### **Welding Platens or Layout Blocks**

Descriptive brochure of welding platens or layout blocks for use wherever metal is formed, welded or handled. Discusses features of semi-steel cast material that resists heat and weld drippings, eliminates warpage and distortion. *Acorn Iron & Supply Co.*

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### **Quick Facts About Alloy Steels**

Handbook contains 44 pages of basic facts about alloy steels. Describes manganese, silicon, nickel, chromium, molybdenum, vanadium, copper, aluminum and boron. Discusses grain size, heat-treatment, flame-hardening, cold-finishing of alloy steels and evaluation of machinability of alloy and carbon steels. *Bethlehem Steel Co.*

... FOR YOUR COPY, CIRCLE NO. 117

### **Resistance Welding Aluminum**

This 27-page booklet explains the principles and procedures for resistance welding aluminum alloys. It describes the spot, seam, flash, and percussion welding processes which are fast, economical means of joining aluminum parts provided the production volume can warrant their use. Also covers stud welding procedures. *Reynolds Metals Co.*

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### **Steel Shot and Grit**

Well illustrated booklet tells how line of steel abrasive is manufactured and outstanding features of the product. Describes testing procedures and discusses applications in foundries, forges and manufacturing plants. *Pangborn Corp.*

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### **Fluxless Aluminum and Universal Solder**

Literature gives complete information about a new solder that melts at ordinary soldering iron temperature and can join any metal with the exception of black or cast iron. Discusses industrial uses for the solder including applications in the motor, aircraft, building, electrical and heavy engineering fields. *Metals for Industry Inc.*

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### **Alloy Steel Castings**

Design advantages and engineering properties of "T-1" alloy steel casting, plus welding and machining data are covered in this bulletin. Discusses features of the alloy steel, its versatility, toughness and strength. *Alloy Steel & Metals Co.*

... FOR YOUR COPY, CIRCLE NO. 121

### **Aluminum Stock Size Chart**

Tabular chart shows the correct stock size of aluminum to use to insure complete clean up of parts. Lists nominal outside diameter, maximum guaranteed finish-machined outside diameter and minimum guaranteed finish-machined inside diameter. *Kilsby Tubesupply*

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### **Investment Casting**

A practical guide to investment casting, this 43-page booklet contains illustrations of typical applications by industries, specifications of standard cast alloys, casting design information and a discussion of manufacturing procedures. *Arwood Corp.*

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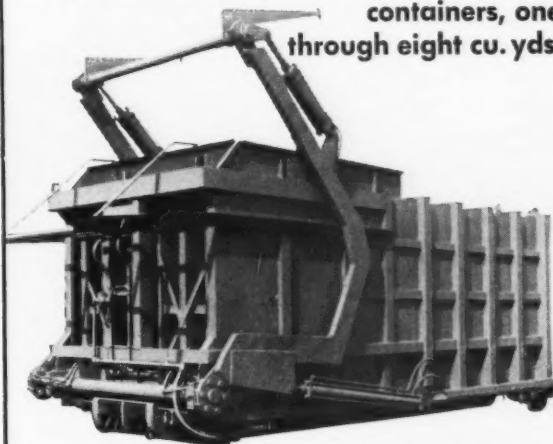


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### Proven Uses of Cemented Hard Carbides

Brochure discusses and illustrates the many new uses of hard carbide compositions for vital machine components and wear-spot applications in practically every industry. Describes outstanding properties of tungsten-base carbides and also a special titanium-base carbide for use at temperatures up to 2200 degrees F and above. *Kennametal, Inc.*

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### Metals Data Book

Handbook contains 256 pages of useful information on steel and aluminum. Steel section tells how steel is made, gives chemical compositions, mechanical properties, ASTM standards, manufacturing practice and tolerances, weights, machining and welding data, safe loads and miscellaneous products data. Aluminum section contains data on properties and fabrication. Includes useful information of a general nature. *Joseph T. Ryerson & Son, Inc.*

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### Steel Stock List

Stock list of hot rolled plate and sheet; cold rolled sheet and strip steel; galvanized sheet steel and hot dipped continuous galvanized coils and sheets. Also aluminum building and embossed sheets. Includes photos of aluminum embossed sheet in various patterns and shows new expanded metal designs for use in industrial and architectural applications. *Ziegler Steel Service Corp.*

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### Electrode Selector

Booklet opens with a table showing conformance of line of electrodes to specifications. Tabulates ten types of electrodes, their AWS grade and color marking, physical properties, chemical analysis and general description. Includes mild steel and low alloy electrodes, special chrome-moly electrodes, stainless steel electrodes, aluminum bronze and phosphor bronze electrodes and others. *Metal & Thermit Corp.*

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### Steel Analyses Booklet

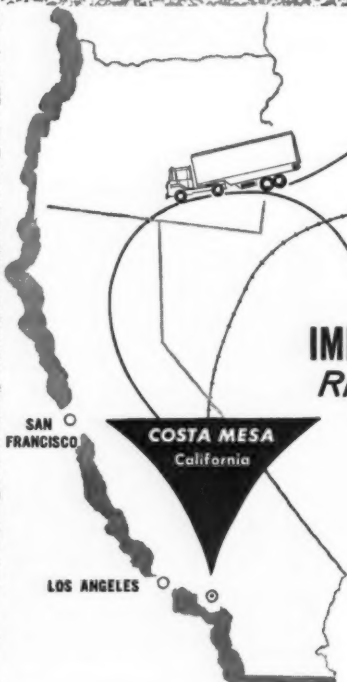
Pocket-size 28-page handbook of steels, covers grades that are designated as standard by the American Iron and Steel Institute. Gives a table form analysis of carbon steels, alloy steels, tool steels and stainless steels. Also contains tables of useful data such as hardness conversion numbers. *Bethlehem Steel Co.*

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### Graphite for Diversified Applications

The outstanding characteristics of graphite for diversified industrial applications are outlined and discussed in this booklet. Tabulates typical physical properties of standard graphite products and typical chemical content. Describes applications in atomic energy, metallurgy, metal fabricating, refractories, aircraft and missiles, rocketry and chemical processing. *Great Lakes Carbon Corp. Electrode Div.*

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## Metals Data

Directory contains 16 pages of information on aluminum, brass, bronze, copper, nickel, silver, rhenium, stainless steel and zirconium. Includes a detailed listing of mill products and specialties. *Chase Brass & Copper Co.*

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## Wire

This 72-page catalog tells the wire story in terms of products, quality and service. Gives complete information on wide variety of wires and thousands of different types, sizes, shapes and finishes. The wires are listed and described in following groups: manufacturers low carbon coarse wires, high carbon fine and specialty wires, low carbon fine and specialty wires, flat and shaped wires. *Colorado Fuel & Iron Corp.*

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## New Abrasive Material

Brochure describes a new metal abrasive made by a new process and available in shot and grit form. Gives chemistry range of the new metal abrasive, outlines outstanding features and economy. *Globe Steel Abrasive Co.*

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## High-Strength, Self-Aging Aluminum Alloy

Special features and characteristics of an aluminum casting alloy which ages at room temperatures, yielding mechanical properties equivalent to heat treated alloys, are described in this brochure. Includes specifications, physical and mechanical properties and details casting methods, dimensional stability, corrosion resistance, machinability and welding, brazing and plating techniques. *Federated Metals Div., Asarco.*

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## Various Grades of Tool Steel

Thumb-indexed circular binder covers line of tool steels including oil hardening, graphitic steel, air hardening, high carbon high chrome, shock steels, hot work steels, high speed steels, hollow tool, flat ground stock, tool steel castings and water hardening steels. *Ziv Steel & Wire Co.*

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## Chromium-Nickel Types Stainless Steel

Forty-page booklet covers the austenitic, chromium-nickel types of the AISI 300 series. Discusses ability to resist corrosion, particularly the organic acids such as acetic and oxidizing acids. Includes laboratory corrosion data, properties at high and low temperatures, data on joining methods, care of stainless steels in fabricating and finishing, mechanical and physical properties, forms and finishes. *Republic Steel Corp.*

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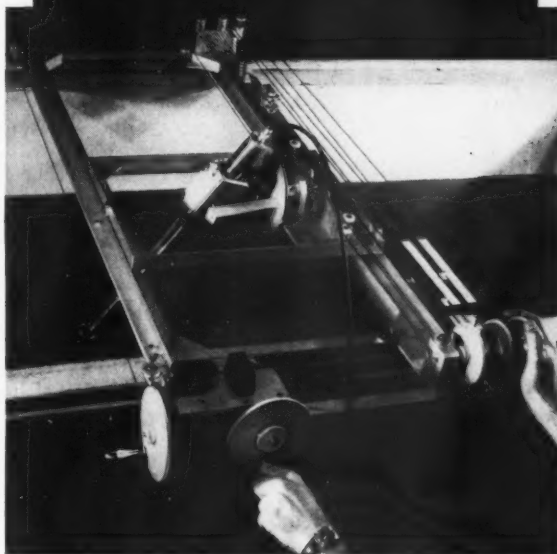
## Stainless Steel Strip

Brochure gives description of firm's production methods and discusses advantages of using fine quality stainless steel strip. Charts special stainless steel types and super metals; includes characteristics of the various steel types. *Wallingford Steel Co.*

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# SCANNING BRIDGE

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This "tailor-made" scanning bridge is used with the SONORAY® flaw detector. It holds the transducer in the required position and also permits its adjustment. The transducer may be raised or lowered, tilted in 2 planes or moved to any position in the tank.

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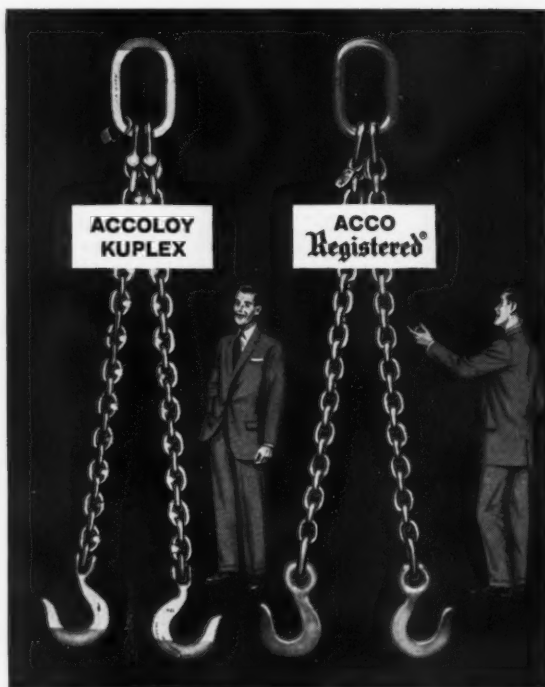
The scanning bridge is merely one of many outstanding examples of BRANSON ingenuity. This bridge was designed with the customer in mind! It was well-engineered at the lowest possible cost. The next time you have a problem, call BRANSON and see how fast BRANSON will find the best solution in the shortest possible time.

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### Precious Metals for Industrial Applications

Brochure describes solid and clad gold and silver for electronic and industrial applications in strip, sheet, tube, wire and solder and brazing alloys. Also covers platinum-group metals in solid or clad form as sheet, wire, tubing and foil. *Texas Instruments Inc., Metals & Controls Div.*  
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### Bronze Alloys for Bushings and Bearings

Booklet contains chemical and physical specifications of cast bronze alloys. Specifications have been prepared to assist in selecting bearing materials best suited for particular requirements. Booklet stresses compressive strength as a critical physical characteristic of bearing materials. *Renewal Service Inc.*  
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### High Strength Steel

Booklet on a chromium-molybdenum-vanadium hot work steel contains numerous graphs and charts. Discusses features of the steel, known as type H-11, including its high strength up to 1000 degrees F, and its use in landing gears, solid propellant rocket cases, structural sections of aircraft and missiles, and many other applications. *Allegheny Ludlum Steel Corp.*  
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### Fusion Welding Aluminum

Handbook details fusion welding of aluminum by the gas torch, the metal arc and the inert-gas-shielded arc methods. Considerable space is allotted to the tungsten, inert-gas and the metal, inert-gas processes. Contains many schematic diagrams and tables. *Reynolds Metals Co.*  
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### Magnetic Properties of Malleable Irons

Publication is a thorough treatise on the magnetic properties of malleable irons. The study was made because of a need for soft, magnetic material in cast form and the research results point out the advantages of pearlitic and martensitic malleables in behaving like steels if allowance is made for the graphite which is present. Well documented. *National Malleable and Steel Castings Co.*  
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### Brazing Alloy

Engineering data about a brazing alloy. Literature describes the material and lists its engineering and brazing properties. Recommended uses are listed and an illustrated typical case history application example is also included. *Wall Colmonoy Corp., Stainless Steel Div.*  
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### Tool Steel Identifier

A 6 by 12-in. tool steel identifier reveals the brand name, producer, AISI number and the firm's equivalent brand at a glance through windows located on both sides. Brands and AISI types are listed alphabetically and numerically. A complete AISI tool steel type classification table is shown on the reverse side of the identifier. *Universal Cyclops Steel Corp.*  
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### **Welded Steel Tubing**

The advantages of using welded steel tubing, its durability and applications are discussed in this bulletin. Includes complete data on tolerances and specifications of carbon steel round and carbon steel square tubing. *Epps Industries, Inc.*

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### **Aluminum Bar Stock**

Brochure is an estimating guide for deep-drawn hollow aluminum bar stock. Reference tables give weights, pre-calculated clean-up and machining allowances, wall thicknesses, lengths and mechanical properties. Other sections of the publication discuss advantages of deep-drawn hollow stock over solid bar stock for machining applications. *Harvey Aluminum.*

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### **Powdered Metal Products**

Booklet describes facilities for Western industry in the field of powder metallurgy. Explains the manufacturing process of making metal bearings, filters, machine and magnetic parts of fine metal powders including compacting, sintering, coining and impregnation. *Asco Sintering Corp.*

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### **Gray Iron Castings**

Booklet about a foundry that makes small and medium sized gray iron castings to specifications using the Meehanite process. Illustrates many casting applications. Includes engineering data, tables and charts covering the many types of iron castings offered. *Compton Foundry.*

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### **Beryllium Copper Strip**

Bulletin outlines advantages of using beryllium copper, gives physical and mechanical properties, and tells how to select the right alloy to meet specification requirements. Five alloys are presented in tabular form with complete data before and after heat treatment. Covers applications in automotive, aviation, electrical, electronic and other industries. *Beryllium Corp.*

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### **Luster Finished Cold Drawn Steel Bars**

The advantages of using carbon and alloy cold drawn steel bars finished with a special process are outlined in this bulletin. Explains what the lusterized finish is and discusses the advantageous features of its use. *Bliss & Laughlin*

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### **Machining Aluminum with Automatic Screw Machines**

New machining concepts and tooling ideas have been integrated into this revised 98-page technical data book. Sections are devoted to automatic screw machines, tooling automatic machines, machining speeds and feeds, availabilities, packaging, cutting fluids for aluminum and trouble charts. Includes numerous tables of technical and tooling information. *Kaiser Aluminum & Chemical Sales, Inc.*

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## RIVETS

Sketches and photographs in this bulletin illustrate a wide variety of applications for "POP" rivets in the building industry. Explains how the rivets work, use of colored rivets, advantages of the line, and lists all types and sizes of rivets available including new closed-end types. "POP" Rivet Div., United Shoe Machinery Corp.

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## PANELING

A new type of decorative, insulated panel for curtain and window walls is described in this brochure. Outlines performance features including simplicity, lightweight, rigidity, weather-tight and advantage of the Mosaica finish available in 17 different colors. Covers data or composition and includes dimensions. Mosaica Div., Soule Steel Co.

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## PUMPS

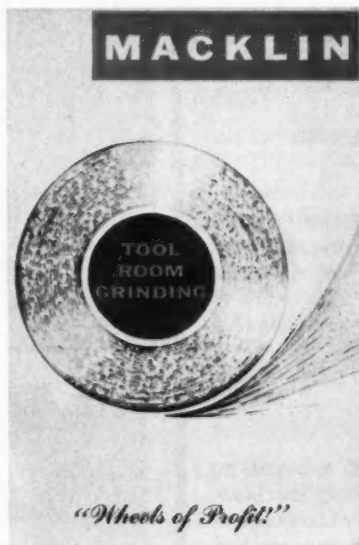
Bulletin about impervious graphite type centrifugal pumps. Covers four basic pump sizes providing capacities up to 140 gpm and heads up to 67 ft. A cut-away drawing illustrates the features of the new carbon-to-carbon rotary seal and a table presents dimensions of the 20 available pump models. National Carbon Co., Div. Union Carbide Corp.

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## SLINGS

Comprehensive 80-page manual is devoted to wire rope slings, their rated capacities, how to choose them and how to use them. Describes many different body styles available, attachments, fittings and terminals. Illustrates basic rules of hitching, chart of hitches and common errors in hitching. Well illustrated. Colorado Fuel & Iron Corp.

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## TOOL ROOM GRINDING

Booklet contains 32-pages of grinding information for tool makers and tool room foreman. Includes a description of wheel symbols and markings; factors governing wheel selection, types of bonds used and wheel structure. Illustrations show typical set-ups for all kinds of grinding operations. Macklin Co.

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## PUMP SEALS

Newly revised pump seal catalog contains listing of over 250 precision engineered pump seals. The individual pump seals are listed with illustrations and complete dimensional and technical data. U.S. Seal Mfg. Corp.

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## CLAMPING CYLINDERS

Illustrated bulletin is devoted to line of single or double acting clamping cylinders. Includes descriptions, specifications, outstanding features, optional features, ordering data and dimensions. Airmatic Valve, Inc.

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## MOTOR

Bulletin about a new fractional horsepower motor covers construction and design details. Each point is illustrated with photos and drawings, and a life size photo of a cut-away motor is shown in full color. Discusses advantages of new ventilation system, and weight reduction. Reliance Electric & Engineering Co.

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## WATER TREATING

Bulletin explains how to treat water in paint spray booths. Discusses the problems which arise from the use of untreated water, and describes the properties that water treating compounds should have for the maximum effect on paint overspray. Lists seven compounds for treating a wide range or organic and synthetic coatings. Oakite Corducts, Inc.

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## PLANT FURNITURE

New 100-page general catalog illustrates complete line of steel equipment products for business and industry. Contains product views, specifications, and installation views depicting the products in action. Includes new line of office chairs, new 42-in. high bookcase; and slotted angle and accessories. Lyon Metal Products Inc.

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## SPEED DRIVES

An extensive line of adjustable speed drives for applications in the ¾ to 2500 hp drive range is presented in this bulletin. Describes four types of complete packaged adjustable speed drives and gives details on available ratings, speed ranges, type enclosures, associated controls and many standard and special modifications. Louis Allis Co.

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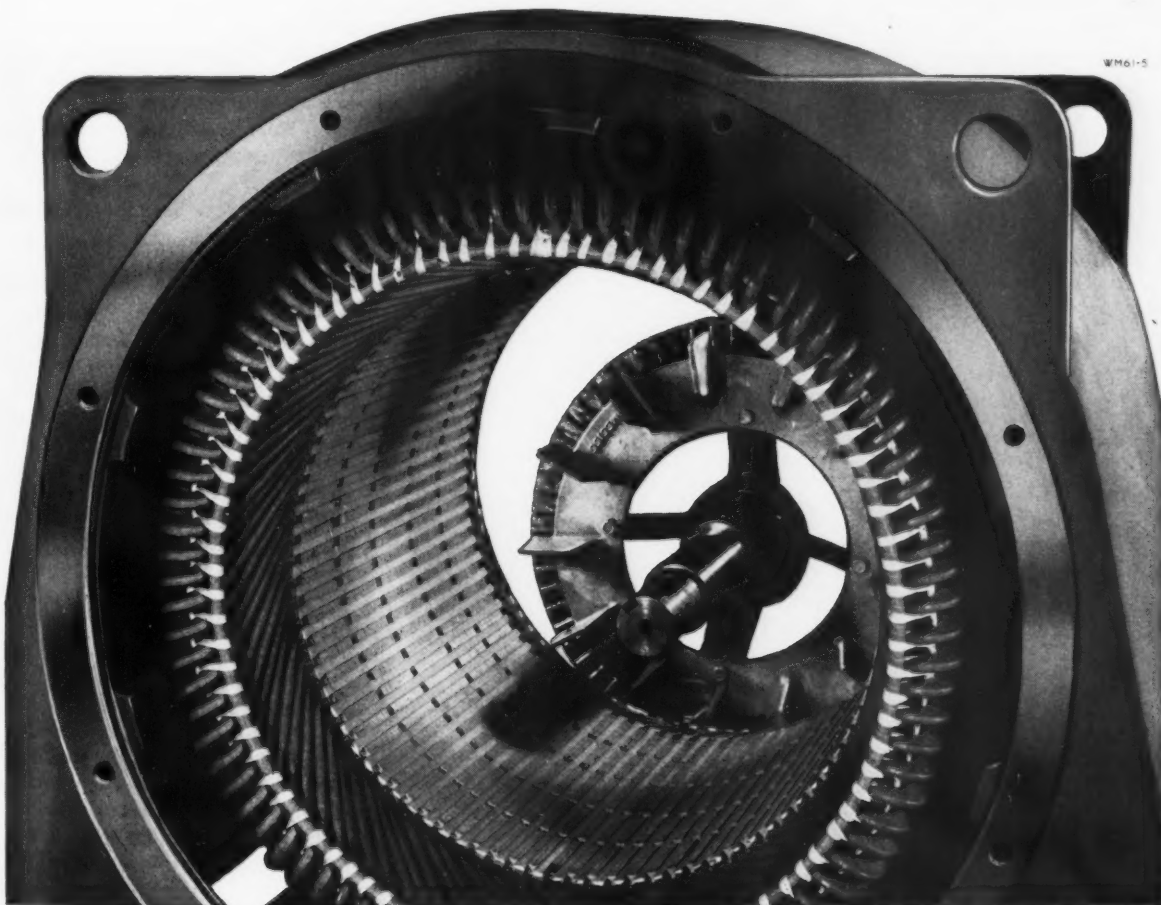
to buy than equivalent totally-enclosed fan cooled motors, since there is no need for expensive enclosures.

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# SPECIALTY METALS...LET REPUBLIC SUPPLY YOU!

stainless aluminum alloy steel cold finished bars

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### DUST COLLECTION

A line of dust collecting, recovery, and classifying equipment is presented in this bulletin. Air pollution, material handling and classification, recovery of material from waste gases, and employee comfort are a few of the broad areas of application for the equipment described. *Buell Engineering Co., Inc.*

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### PRECISION GEARS

New 128-page catalog of line of stock precision I, II, and III gears and precision instrument clamps. The handy pocket-size booklet contains diagrams, dimensions and other statistical data for easy selection by engineers and purchasing groups in the electro-mechanical industry. *Perfect Gear and Instrument Corp.*

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### STRAINERS

Over 600 standard self-cleaning strainers for steam, air gas, and liquids including cryogenic services, are detailed in this catalog. Shows wide selection of available body materials, end connections, pressure rating and sizes. Complete pressure drop and pressure-temperature limit data is provided. *Leslie Co.*

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### TANK GAUGES

Complete information on a new series of high-pressure automatic tank gauges is contained in this bulletin. Includes installation diagrams of the tank gauges and describes features such as the use of a neg'ator motor and a magnetic drive in the gauges and the advantages gained. *Vapor Recovery Systems Co.*

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### HEAT EXCHANGERS

Two standard heat exchanger lines are covered in this bulletin. Discusses applications and engineering features of the heat exchangers which have straight tubes, externally packed floating tube sheets, removable bundles and single or two-pass design. Includes complete design and dimensional data. *American-Standard Industrial Div.*

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WESTERN INDUSTRY/MARCH 1961



#### DRIVE SYSTEMS, TIMING DEVICES

Comprehensive new catalog contains several hundred pages listing engineering information and dimensions of small electro-mechanical drive systems, timing devices, variable speed controls, speed reducers and electric motors. Includes wealth of engineering data and application information. *Minarik Electric Co.*

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#### COMPRESSOR

A new heavy-duty rotary compressor for general purpose services, including those requiring delivery of oil-free air, gas or vapor, is described in this bulletin. Lists performance coverage and discusses applications in the chemical, petro-chemical and heavy mass-production industries. *Fairbanks, Morse & Co., Compressor Div.*

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#### SILICONE RUBBER CHART

Four-color chart is designed to assist designers and engineers in all industries in selecting the proper type of silicone rubber for particular requirements. Contains comprehensive data on applications, typical properties, primary classes and standard industry and military specifications. *General Electric Co., Silicone Products Dept.*

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#### CUTTING TOOLS

Descriptions and dimensional data on a line of standard and special tools is contained in this 35-page illustrated catalog. Covers gun drills, boring tools and holders, pipe reamers, contour cutters, flat form tools for standard hydraulic fittings, end mills, routers, milling cutters and hollow mills. *Wetmore Tool and Engineering Co.*

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#### COUPLINGS

A line of torsionally resilient Steel-flex couplings is the subject of this bulletin. Includes additional coupling types, dimensions for larger sizes, and easy methods of selection. Explains and illustrates how unique grid-groove coupling design protects connected machines against shock, vibration, and misalignment. Also engineering data. *Falk Corp.*

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# SPECIALTY METALS...LET REPUBLIC SUPPLY YOU!

stainless aluminum alloy steel cold finished bars

## THE REPUBLIC SUPPLY COMPANY

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## LITERATURE ADVERTISED IN THIS ISSUE

**Elf Series** of battery powered electric lift trucks. *Automatic Transportation Co.*  
Page 53 Circle No. 26

**Floor Plate** that is easy to fabricate and clean. *Alan Wood Steel Co.*  
Page 22 Circle No. 15

**Welded Steel Pipe** for industrial uses. *Armco Drainage & Metal Products Co.*  
Page 23 Circle No. 16

**Power Transmission** products, engineering data. *Acme Chain Corp.*  
Page 43 Circle No. 24

**Chain Link Fences** for industrial protection. *Anchor Fence.*  
Page 75 Circle No. 43

**Flexible Cushion Couplings** compensate for misalignment. *Dodge Mfg. Corp.*  
Page 44 Circle No. 25

**Bolts or Screws Preassembled** with spring fasteners. *Eaton Mfg. Co.*  
Page 15 Circle No. 22

**Monoform System** for roof maintenance. *Flintkote Co.*  
Page 72 Circle No. 39

**Foundry Machinery**, complete data on full line. *Fernholtz Machinery Co.*  
Page 80 Circle No. 47

**Shaft Mounted** and flange mounted drives. Bulletin. *Falk Corp.*  
Pages 8 & 9 Circle No. 5

**Lubricants** for all sizes and types of machinery. *Lubriplate Div., Fiske Brothers Refining Co.*  
Page 94 Circle No. 63

**Payloader Tractor** shovels in sizes to fit every material handling need. *Frank G. Hough Co.*  
Page 85 Circle No. 53

**Field Warehousing** for more working capital. *Haslett Field Warehousing.*  
Page 101 Circle No. 69

**Steel Equipment** for business and industry. Product catalog. *Lyon Metal Products, Inc.*  
Page 6 Circle No. 4

**Laboratory** equipment and furniture. Catalog. *Metalab Equipment Co.*  
Page 62 Circle No. 31

**Testing Equipment**, controls and instruments. *Pacific Scientific Co.*  
Page 100 Circle No. 68

**Rotary Union** seals perfectly at any angle. *Perfecting Service Co.*  
Page 79 Circle No. 46

**Poly-V Belt** for higher hp capacity per inch of drive width. *Raybestos-Manhattan, Inc.*  
Page 14 Circle No. 9

**Stainless Socket Screws** with 125,000 psi minimum tensile strength. *Standard Pressed Steel Co.*  
Page 57 Circle No. 28

**Western Productivity** and economic data to aid industry in expansion planning. *Soule' Steel Co.*  
Cover 4 Circle No. 73

**Mechanical Packings**, illustrated catalog. *Searle Leather & Packing Co.*  
Page 81 Circle No. 49

**Welded Tubing**, 48 page handbook. *Van Huffel Western Corp.*  
Pages 16 & 17 Circle No. 11

**Screw Conveyor Drives**, data bulletin. *Falk Corp.*  
Pages 8 & 9 Circle No. 74

**Conveying Systems** engineered to speed materials efficiently. *Lamson Corp.*  
Page 40 Circle No. 21

**Ball Valves**, catalog of data and specifications. *Pacific Valves, Inc.*  
Page 91 Circle No. 61

**Trailer Service** throughout the West and Midwest. Route map. *Pacific Intermountain Express.*  
Page 29 Circle No. 18

**Fasteners** that sustain against corrosion. Catalog. *Coast Industrial Supply Co., Inc.*  
Cover 2 Circle No. 1

**Power Transmission**, 9496 standardized quality products. Catalog. *Boston Gear Co.*  
Page 59 Circle No. 29

**Weighfeed Materials** at a constant pre-determined rate. Waytrols catalog. *Jeffrey Mfg. Co.*  
Page 11 Circle No. 7

**Tool Catalog**, 128-page hand and power tool buying guide. *Snap-on Tools.*  
Page 97 Circle No. 67

**Catalog** on new color horizons system; and test sample of damp-proof red primer. *Rust-Oleum Corp.*  
Pages 20 & 21 Circle No. 14

**Non-Clog Pumps** for industrial wastes. *Pacific Pumping Co.*  
Page 86 Circle No. 54

**Automatic Handling** system operates between buildings, floors. *Cleveland Tramrail Div.*  
Page 19 Circle No. 13

**Portable Electric Tools** that need less maintenance. *Milwaukee Electric Tool Corp.*  
Page 3 Circle No. 2

**Tubing** stocklist. *Kilsby Tubesupply.*  
Page 95 Circle No. 65

**High Pressure Washers** *John Bean.*  
Page 43 Circle No. 24

### BORING TOOLS

Full information regarding a line of multi-point precision boring cutters is contained in this 24-page catalog. Discusses features of an individual cartridge adjustment for initial setting, and a micrometer adjustment for simultaneous insert control during the production run. Includes layouts of 12 different boring tool styles. *Valenite Metals, Div. Valeron Corp.*

... FOR YOUR COPY, CIRCLE NO. 222

### INSTRUMENTATION CATALOG

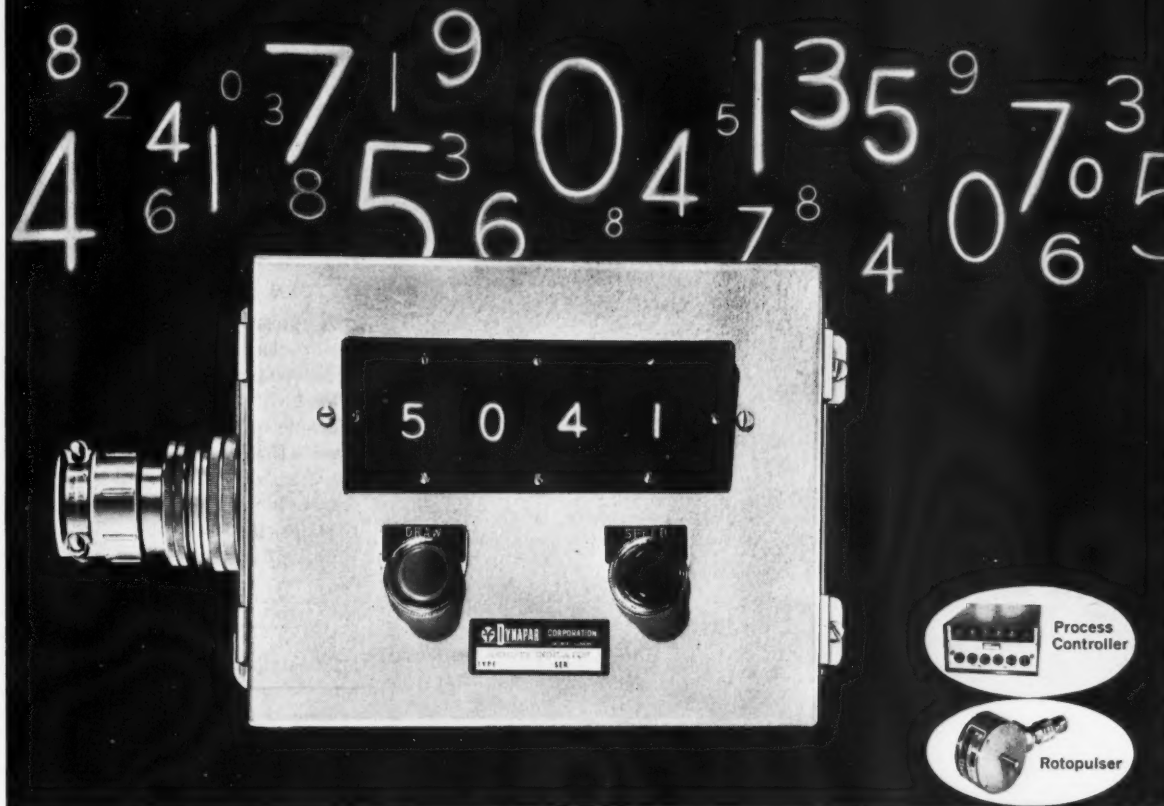
New 71-page, 855-item catalog lists instrumentation and other electro-mechanical components. Includes instrumentation equipment for measuring pressure, force, temperature, acceleration, rotary-linear displacement, recording devices and associated telemetering equipment. Also lists synchros, motors, inverters, pneumatic and hydraulic controls. *AST Co., Inc.*

... FOR YOUR COPY, CIRCLE NO. 224

### FASTENERS

Condensed catalog contains essential engineering data and specifications on line of hexagon nuts, locknuts, specials, weldnuts, pointer nuts and airforce-navy aeronautical nuts. Engineering section is devoted to terminology, fastener design, bolt tightness and wrench torque, thread series and applications. *National Machine Products Co.*

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## NOW...Louis Allis offers DYNAPAR\* Digital Control Systems!

**Louis Allis can supply accurate digital controls designed to  
Industrial standards for a wide variety of continuous process lines**

For any production process, Louis Allis can furnish not only motors, drives, and controls, but also digital monitoring equipment to provide visual readout and process control signals.

The answer is DYNAPAR Digital Control — a highly accurate digital logic system that can count, measure, totalize, indicate, time, or control depending on the requirements of the application. Digital systems are ideally suited for high speed counting — accurate measurement of speed and draw — automatic cutting-to-length — automatic positioning — and many other applications.

Dynapar's digital devices utilize precise pulses, and eliminate the drift inaccuracy inherent in magnitude-measuring analog systems. There's no need for constant

calibration or adjustment. Pulses are reliably provided by rugged ROTOPULSERS, highly stable sensing and pulse generating devices—visual indication is obtained by easily-read luminous direct numerical readouts. Control functions are accomplished by a variety of special devices tailored to specific operations. All DYNAPAR equipment features the most modern solid-state transistorized circuitry to provide long-life operation without maintenance.

Investigate to see how Louis Allis-Dynapar equipment can increase production and cut waste by automating your process. Call your local Louis Allis District Office, or write to The Louis Allis Co., 438 E. Stewart Street, Milwaukee 1, Wisconsin.

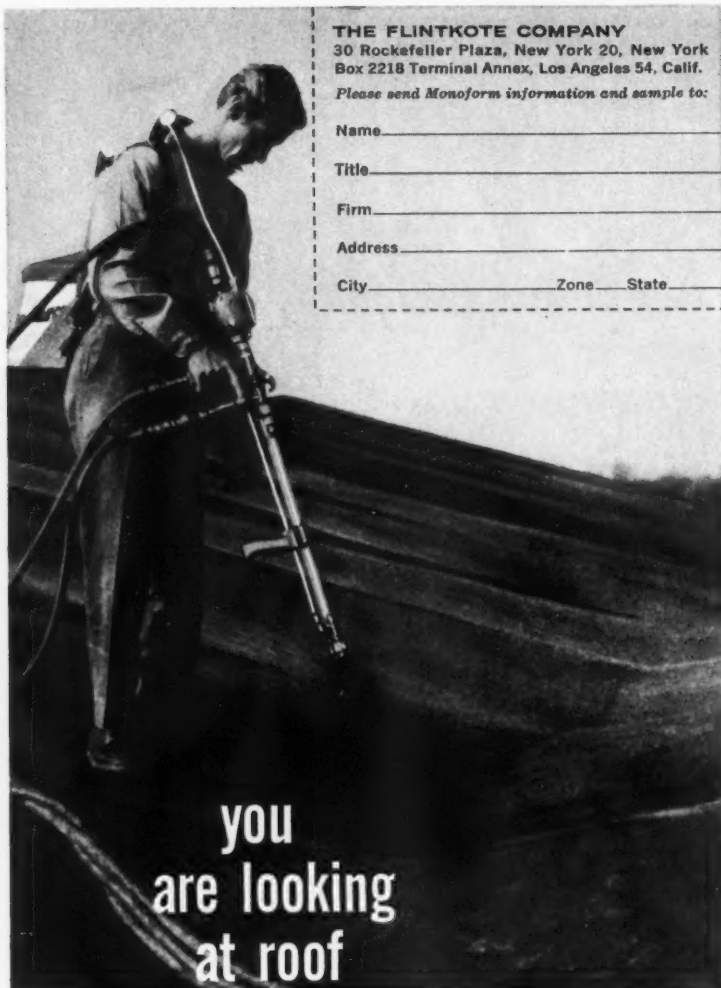
\*Dynapar Corporation is the electronic subsidiary of The Louis Allis Co.

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are looking  
at roof  
maintenance  
the modern way

With the new FLINTKOTE MONOFORM System a true monolithic membrane can now be applied over old roof areas, as well as new structures. The inherent structural strength of this membrane reduces the addition of burdensome weight to your existing roofs—and also can eliminate costly “tear offs,” too. Basic tool is the versatile Sealzit® gun which cuts glass roving to predetermined lengths and sprays out the fibres together with liquid compounds to provide a stronger, weather-resistant roof.

Guide specifications are available for composition, corrugated and gravelled roof areas. *Send coupon above for information and sample.*

For detailed information on Monoform Roof Maintenance see our catalog 10C/FL in Plant Engineering Sweets File.



**FLINTKOTE monoform<sup>®</sup> SYSTEM<sup>†</sup>**

THE FLINTKOTE COMPANY  
30 ROCKEFELLER PLAZA, NEW YORK 20, N.Y.  
BOX 2218 TERMINAL ANNEX, LOS ANGELES 54, CALIF.

\* A TRADEMARK OF THE FLINTKOTE COMPANY † U.S. PATENT APPLIED FOR

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THE FLINTKOTE COMPANY  
30 Rockefeller Plaza, New York 20, New York  
Box 2218 Terminal Annex, Los Angeles 54, Calif.  
Please send Monoform information and sample to:

Name \_\_\_\_\_  
Title \_\_\_\_\_  
Firm \_\_\_\_\_  
Address \_\_\_\_\_  
City \_\_\_\_\_ Zone \_\_\_\_\_ State \_\_\_\_\_

## INDUSTRIAL BUCKET ELEVATORS

Booklet on industrial bucket elevators for the handling of bulk materials contains engineering data on various types. Recommends the grades of belting best suited for elevating materials of different weight, abrasiveness, temperature and other characteristics. *Hewitt-Robins, Inc.*

... FOR YOUR COPY, CIRCLE NO. 227

## OXYGEN SENSOR

A polarographic oxygen sensor which can be used in applications where potential toxicity exists is the subject of this bulletin. Discusses principle of operation and describes a special lightweight high-impedance amplifier designed for use with the sensor. Includes comprehensive specifications. *Beckman Instruments, Inc.*

... FOR YOUR COPY, CIRCLE NO. 228

## SLUDGE COLLECTORS

Booklet describes line of straight-line sludge collectors for rectangular settling tanks. New data in publication enables selection of the proper size tank for both the type “H” and type “L” sludge collectors. Includes reprint of the “Ten States Standards for Sewage Works” specifications for sedimentation tanks. *Link-Belt Co.*

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## UNIVERSAL MARKER

A universal tool for marking any surface, flat or curved, for cutting or to mark ellipses is described in this bulletin. Originally designed to simplify the marking of pipe for welding, the marker has found a much wider application in many construction, production and maintenance activities which are detailed in bulletin. *Boyd Brothers & Sullivan*

... FOR YOUR COPY, CIRCLE NO. 230

## WASHROOM CABINETS

Comprehensive catalog contains complete information on washroom paper towel and toilet tissue dispensers and receptacles. Also technical and architectural data on installation of new units or modernization of washrooms. Includes data covering efficient traffic patterns, correct cabinet placement and installation. *Crown Zellerbach Corp.*

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WESTERN INDUSTRY/MARCH 1961



## BEARINGS

Self-aligning bearings and rod end bearings are illustrated and described in this 56-page catalog which covers an entire line. Includes data on new series of plastic alloy insert, self-lubricated bearings available in a variety of plain or rod end types. *Southwest Products Co.*

... FOR YOUR COPY, CIRCLE NO. 232

## LIFT TRUCK

A heavy duty Sitdrive electric fork lift truck is described in this bulletin. Contains illustrations, specifications, and operating characteristics of the new Sitdrive which is available in 30 different models. Explains an exclusive drive control system that permits exact inching and load spotting. *Lewis-Shepard Products Inc.*

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## ELECTRONIC MONITORING

A new high speed, continuous electronic monitoring system which can accurately monitor any condition that can be represented by an electrical contact closure is described in this booklet. Discusses applications, covers basic construction and specifications. *Lynch Communications Systems Inc.*

... FOR YOUR COPY, CIRCLE NO. 234

## INTERIOR FIRE FIGHTING

Catalog provides complete and latest feature information on line of portable type interior fire safety equipment for industrial plants, refineries, etc. Includes comprehensive engineering and specification data on nine categories of hand portable model fire extinguishers, fire hose and extinguishers, fire hose and extinguisher wall cabinets. *Fyr-Fyter Co.*

... FOR YOUR COPY, CIRCLE NO. 235

## FRESNO BROCHURE

Attractively illustrated 20-page brochure is devoted to a description of the City of Fresno, California, and the advantages it has to offer for industrial location. Discusses the unique "agribusiness" economy of the Central California city and the cultural advantages Fresno has to offer. *Fresno County-City Chamber of Commerce*

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COMPLEX CROSS  
SECTIONS AVAIL-  
ABLE AS ROLLING  
MILL CONTOURS.

# SEAMLESS RINGS AND FLANGES

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SIMPLE OR COMPLEX  
CROSS SECTION

CONTOUR PROCESSING OF  
REFRACTORY  
HI-TEMP  
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HI-PRECISION  
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## HOW TO SAVE MONEY

## BY RIVETING

**I** Design for rivets. Use their adaptability not only for assembly, but for electrical contacts, pivots, inserts in molded materials, fastening a number of parts in one operation, joining metallic and nonmetallic parts together, or to each other.



**Plan on high speed assembly.** Riveting is a high speed operation, and even manually operated machines include automatic hoppers. The uniform quality and strength of Milford semi-tubular, tubular, split or compression rivets permits the use of high speed production equipment by unskilled operators.



**Count on a positive joint.** A riveted joint can be visually inspected, an advantage not to be overlooked when compared to many other methods of fastening.



**Use Milford's "five plant" facilities.** Each Milford plant is strategically located to serve the important industrial areas of the U.S. Order and get Milford Products when and where you need them.



**Have uninterrupted production** with Milford rivet-setting machines. Used singly, or in economical "multiples", where you set more than one rivet with no increase in labor or handling costs, Milford riveters, setting Milford rivets, are the surest way to lowest in-place assembly cost.



**MILFORD RIVET & MACHINE CO.**

MILFORD, CONNECTICUT • HATBORO, PENNA.  
ELYRIA, OHIO • AURORA, ILL. • NORWALK, CALIF.

... for more details, circle No. 41

### FILTERS

Brochure explains how vacuum filters work and catalogs two new types of filters: one type for removing dirt and water, and another type for removing oil, dirt and water. Includes specifications and data on accessories. *Wilkerson Corp.*

... FOR YOUR COPY, CIRCLE NO. 237

### MILLING CUTTERS

New 44-page catalog gives complete specifications on lines of throw-away and conventional carbide milling cutters, accessories, blades, parts and tools. All types of cutters are illustrated and exploded views are included to show simplicity of cutter maintenance. *Wesson Co.*

... FOR YOUR COPY, CIRCLE NO. 238

### ELEVATOR MAINTENANCE

A preventive maintenance program organized to protect elevators at economical cost is described in this 24-page booklet. On-the-job photos show typical steps in an efficient procedure planned to keep elevators operating like new even after decades of service. *Otis Elevator Co.*

... FOR YOUR COPY, CIRCLE NO. 239

### TUBING TOOLS, MACHINES

A complete line of pipe, tubing tools and machines is presented in this illustrated catalog. Sections are devoted to tubing tools and machines; pipe wrenches, vises and stands; power drives and power pipe machines. *Toledo Pipe Threading Machine Co.*

... FOR YOUR COPY, CIRCLE NO. 240

### INFRARED HEATERS

A new line of electric infrared heaters for direct radiant heating of hard-to-heat indoor and outdoor areas without heating of the intervening air is described in this booklet. Principles, advantages, and typical applications of electric infrared comfort heating are discussed. *Fostoria Corp.*

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### CENTRIFUGAL PUMPS

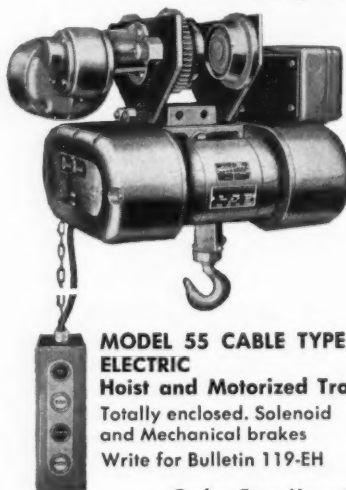
Specifications, an interchangeability chart, performance curves and dimensions of a line of single stage, double suction centrifugal pumps are set forth in this booklet. Includes new sizes that have been added to the line, and discusses outstanding features. *Goulds Pumps, Inc.*

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**David Round**

**for HOISTING EFFICIENCY**

...especially in work areas  
cramped for headroom



**MODEL 55 CABLE TYPE  
ELECTRIC  
Hoist and Motorized Trolley**  
Totally enclosed. Solenoid  
and Mechanical brakes  
Write for Bulletin 119-EH

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**Cable-Aire  
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Meets requirements for operation  
in hazardous atmospheres  
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Chain Hoists • Electric and Air Hoists & Winches  
Cranes • Sheaves & Chain



**DAVID ROUND & SON, INC., CLEVELAND 39, OHIO**

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## BLAST CLEANING

Brochure describes a simple, efficient unit which uses the principle of controlled centrifugal force for its blasting power. Discusses design refinements of the unit which increase production speed yet reduce cost of operation. Explains operation and features of construction. *Pangborn Corp.*

... FOR YOUR COPY, CIRCLE NO. 243

## BOILER AUTOMATION

A definite, well illustrated study of the current status and future of boiler automation is contained in this bulletin. Discusses the application of electronic computers, programming, methods of automation, flame detection and burner control, weak links in automation and conclusions. *Babcock & Wilcox Co., Boiler Div.*

... FOR YOUR COPY, CIRCLE NO. 244

## SOCKET SCREW

New high performance socket head cap screws with increased fatigue life are reviewed in this technical bulletin. Application data covers the principle mechanical properties and illustrations show such design and fabrication features as the forged socket and head. Complete dimensional data. *Standard Pressed Steel Co.*

... FOR YOUR COPY, CIRCLE NO. 245

## SCREW FEEDER PERFORMANCE

Tested performance of screw feeding equipment for 456 different dry materials from abrasives to zinc stearate is described in this brochure. Indicates the density in pounds per cubic foot for each of the materials tested, the screw size of the feeder, maximum rate in pounds per minute and the measured per cent of accuracy and consistency. *Vibra Screw Feeders Inc.*

... FOR YOUR COPY, CIRCLE NO. 246

## INDUSTRIAL HEATING

Supplement to industrial electric heating catalog contains specifications and product illustrations of electric heater bands, air heating elements, blower-type heaters, immersion units, engine heaters, mineral insulated heating cable, special radiant heaters for process and comfort heating, controls and various other elements and equipment. *Edwin L. Wiegand Co.*

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WESTERN INDUSTRY/MARCH 1961

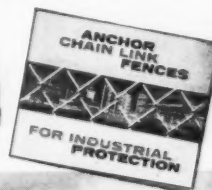


# "...our fence definitely discourages pilferage..."

SAYS EAST COAST BOTTLING COMPANY

"When this new soft drink plant went up in the fall of 1959, 700 feet of Anchor Fence were installed at the same time. The architect specified chain link for its durability and maximum protection features. The contractor selected Anchor Fence after competitive pricing. Our Anchor Fence prevents trespassers from short-cutting through the property and definitely discourages pilferage from trucks left in the yard overnight. The sliding gate is very valuable in helping us avoid traffic tie-ups."

Call your local Anchor office today for a talk with one of Anchor's trained sales engineers. Write for free catalogue to: **ANCHOR FENCE**, 6620 Eastern Avenue, Baltimore 24, Maryland.



Plants in Baltimore, Md.; Houston, Texas; and Whittier, Cal. • Sold direct from factory branches in all principal cities.



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# NEW EQUIPMENT

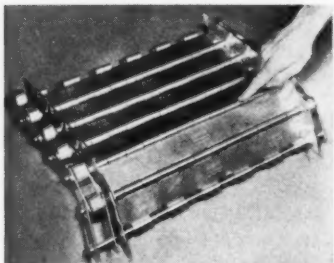
FOR WESTERN PLANT OPERATION, PRODUCTION AND MAINTENANCE



USE RIP OUT POSTCARD, PAGE 91, FOR MORE INFORMATION ON PRODUCTS DESCRIBED

## STEEL BELTING

... allows reduction of conveyor depths



A new line of heavy-gauge, hinged-steel conveyor belting, with specially designed short-pitch belt links has been developed. The design is compatible with existing conveyors using hinged-steel belting.

The shorter-pitch link permits a considerable reduction in over-all section depth of conveyor designs. Developed for industrial conveyor applications where operating conditions are more rugged than normal, the heavier gauge steel belting is assembled from patented-design hinged links. Fabricated from  $\frac{1}{8}$  in. thick steel, each individual belt link has a  $2\frac{1}{2}$  in. pitch. The shorter  $2\frac{1}{2}$  in. pitch allows the assembled hinged-steel belt to run on sprockets with a pitch diameter as small as 5 inches. As a result, over-all conveyor depth can be as little as  $8\frac{1}{2}$  inches. *May-Fran Mfg. Co.*

... FOR MORE DETAILS, CIRCLE NO. 300

## NEW PACKAGE

... aids in grinding wheel inventory



A new type of package has been developed for this firm's internal and other small grinding wheels. The package, part of an over-all new system of packaging, is more convenient for storage, inventory, and

use. It is a clear plastic tube capped at each end for easy removal of the grinding wheels. Inventory control is simplified because the number of remaining grinding wheels can be seen at a glance. With no sawdust to remove, the grinding wheels are always ready for use. The packaging materials provide better protection from dirt and breakage during transit and storage. In addition, the wheels are pre-packaged in quantities that make logical units of supply for the different grinding operations. *Bay State Abrasive Products Co.*

... FOR MORE DETAILS, CIRCLE NO. 301

## HYDRAULIC CUTTER

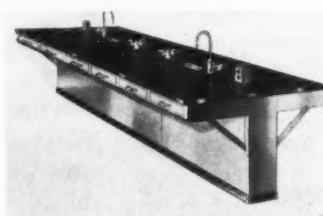
... for vacuum formed parts

A hydraulic press, known as the Trim-O-Matic, cuts out multiple parts in one complete, automatic operation. It also cleanly trims skin-packaged parts, cutting away all excess material. Platen area is a full 18"x18". Cutting cycle is preset according to the thickness of the material being trimmed. Two start buttons, one on each side, require the use of both hands, a safety device for the protection of the operator. Casters permit it to be rolled to any place in the plant and plugged into any 115 volt outlet. Height is 45", width 27 $\frac{1}{2}$ ", depth (including loading table) 43", weight 1200 lbs, and ram force 16 tons. *Product Packaging Engineering.*

... FOR MORE DETAILS, CIRCLE NO. 302

## LABORATORY TABLE

... has new design treatment



A new laboratory table is offered with a unique treatment in design and function. Called Modular Labconsole tables they are available in either center or wall types and

provide completely unobstructed knee space that contributes to good posture and comfort as well as presenting a modern appearance. Tables are solidly anchored to the floor which makes them structurally sound. All service piping and wiring is concealed in the structural island, but is easily accessible for maintenance. The table shown is 12-ft. long, 4-ft., 6-in. wide, and 3-ft., 1-in. high. A wide range of other sizes are also available through Modular design. *Metalab Equipment Co.*

... FOR MORE DETAILS, CIRCLE NO. 303

## VACUUM FILTER

... removes 5 micron particles

A new filter for vacuum service has been announced. Having a large impregnated felt cartridge that is reuseable, the new Model 1125MV filter will remove particles as small as 5 microns in size without restriction to the vacuum flow. Oil fumes can also be removed. These filters will handle flows up to 4000 cfm and are equipped with a petcock for draining the large sumps. They are available from stock in pipe threads of  $\frac{1}{4}$ " to 2", and with pipe flanges for lines up to 8". *Wilkerson Corp.*

... FOR MORE DETAILS, CIRCLE NO. 304



**"You feel the  
difference  
with a  
KOOLIE HAT wheel..."**



*"I can work almost half again as long without getting an ache in the wrist and arm muscles," says Walt Via (shown above grinding a Utility Trailer king-pin assembly).*

"...even after a long stretch of grinding, I'm not tired. Its unusual shape makes grinding hard-to-get-at spots easy." That's what Operator Walter Via says about the Koolie Hat wheels he's been using at Utility Trailer Manufacturing Company, Los Angeles, one of the West Coast's biggest manufacturers of custom-built trailers.

Here's *why* Bay State's unique reinforced resinoid disc-wheel is the least fatiguing, fastest, safest wheel on the market:

**Easier Operation** "Koolie Hat" wheel is held at 4° to 5° angle instead of 25° to 30°, requires less pressure, virtually eliminates jitter and bounce.

**Extra Safety** "Koolie Hat" shape wears evenly over all three abrasive layers instead of one at a time. Less danger of shattering due to heat cracks or thinning of wheel.

**More Uniform Speed** Narrow radial contact surface between "Koolie Hat" wheel and surface keeps speed high for fast, efficient metal removal without heat build-up.

If you want to give your operators (and your profit curve) these advantages, get the full story from your Bay State distributor or direct factory representative. *Better grinding at lower cost, that is their business.*



*Bay State representative Emil F. Rogers (left) shows the unique shape of the Koolie Hat wheel to Utility Trailer's Director of Purchasing, Virgil D. Waters (right) and Lead Operator Walter Via (center).*

**NEW U-grade formulation** complements original "Koolie Hat" R-grade wheel, ensures extra-long life when grinding all materials with higher speed grinders operating at 5200 r.p.m. or above.



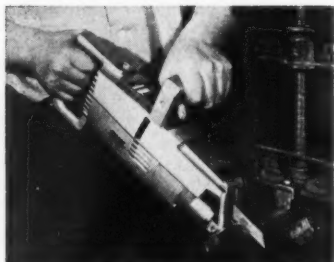
**BAY STATE  
ABRASIVES**

Bay State Abrasive Products Co., Westboro, Massachusetts.  
West Coast Headquarters: 3480 Cherry Ave., Long Beach, Calif., Phone: GARfield 7-2983, 7-4947

... for more details, circle No. 44 on Reader Service Postcard

## PORTABLE SAW

... will cut stainless steel

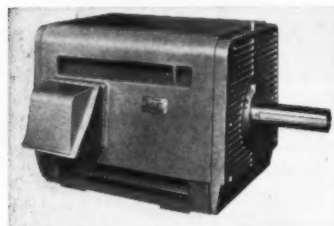


An all new tool, the Model 701 Recipro saw, has two speeds, 1000 and 1400 strokes-per-minute, for cutting different gauges and densities of metal. The low speed is for stainless steel, other hard alloys, cast iron, any hard abrasive material. The high speed is recommended for cutting mild steel and non-ferrous metals. This extra heavy-duty tool is for use by truck body plants, welding shops, plumbers, contractors, electricians, steel warehouses, metal fabricators and other metalworking users. It is excellent for any metal cutting job requiring a portable tool for cut-off or pattern work. The new saw has a foot which adjusts in and out more than one inch making it possible to greatly increase blade life. This foot has 12 depth-of-cut adjustments. Blades mount off-center on the saw for cutting close to walls and corners. Blades are also reversible for either up or down cutting. Speed selection is by a slide switch in the rear handle. Designed for minimum maintenance under heavy professional service, the model has only three main moving parts. Ball and needle bearings are used throughout. Convenient top handle adjusts to three different positions for comfortable, positive control by either left or right handed operators. *Skil Corp.*

... FOR MORE DETAILS, CIRCLE NO. 305

## NEW MOTOR

... puts horsepower in smaller package



A new A-C motor, called the Duty Master D-5000, has a round stator inside its nearly square frame. This unusual arrangement provides better cooling, permitting using a smaller overall dimension for any given horsepower rating. The D-5000, which is available from 125 through 300 hp., has large air intakes which cover each end of the motor. Air is drawn in these louvered openings, ducted through the rotor and stator, and then exhausted at the sides. The result, is more efficient cooling and more horsepower. Class B insulation is standard on the Duty Master D-5000 and frames and end louvers are cast iron. The louvers can be removed for inspection and maintenance. The motor is being offered with either sleeve or ball bearings. Drip-proof enclosure is standard, but splash-proof enclosures can be specified. In addition, encapsulated stators are available for severe conditions. Either 220, 440, or 550 line voltages are available for 3600, 1800, 1200 and 900 rpm operation. A totally-enclosed fan-cooled design will be available soon, and horsepowers up to 2000 will be ready in early 1962. *Reliance Electric & Engineering Co.*

... FOR MORE DETAILS, CIRCLE NO. 306

## ELECTRONIC GOVERNOR

... for precise D-C motor control

A new heavy-duty electronic governor is now available for precise speed control of shunt wound direct current motors up to one horsepower. The governor maintains a constant motor speed at any selected value despite variations in load, line voltage or motor temperature. Operating from a 230-volt 50-60 cycle single phase line, the unit is available either as a stripped chassis suitable for incorporation into other equipment, as a rack mounted unit, or as a self-contained unit enclosed in a cabinet. *Linde Co.*

... FOR MORE DETAILS, CIRCLE NO. 307

## STRADDLE TRUCK

... designed to handle with ease of smaller unit



A new, 30-ton straddle truck carrier designed to handle with the ease of a carrier half its size is announced. From road to roof, the new "big truck" combines the concept of "human engineering" with top performance characteristics for faster, safer handling of loads up to 60,000 pounds. Leading the features designed into the new M600A carrier is an all-hydraulic lift system that eliminates mechanical linkage, sprockets, chains—problem sources that hamper full-time operation. Two high pressure pumps, one powers the load lift and one powers shoe swing and steering, provide instant lift response. Power normally lost through mechanical lift designs is reclaimed for greater load handling efficiency. A flow motor provides equal hydraulic pressure at four lifting points, equalizing cylinder travel for dependable operation. A four way check valve locks each loaded cylinder in place. A full-flow hydraulic oil filter keeps hydraulic fluid clean of impurities that can clog and damage vital parts. Located in the hydraulic tank filling tube, the exclusive feature continuously filters all hydraulic oil as it passes through the system. Down time for servicing hydraulic components, even in applications where air pollution is high, is held to an absolute minimum. Ample power is supplied by one of two selected power plants, a 192 hp Continental 6-cylinder gasoline engine or a 172 hp Continental Diesel engine, power enough to meet the most extreme yard or terrain conditions. *Hyster Co.*

... FOR MORE DETAILS, CIRCLE NO. 308

## PREHEAT INDICATOR

... enhances boiler efficiency

Provides savings in oil consumption by determining the correct preheat temperature of the fuel oil for maximum boiler efficiency, thus releasing maximum number of BTU's. The unit also provides a means for measuring the viscosity of any oil (or other liquid) at any temperature by using steam, hot water or coolant. The model is easily installed and easy to operate by inexperienced, nontechnical personnel. Sturdily constructed and machined to scientific accuracy, an electrically operated model is also available. *Gamlen Chemical Co.*

... FOR MORE DETAILS, CIRCLE NO. 309

## RECORDER-CONTROLLER

...incorporation into single unit has twofold advantages

A single-case time-program recorder-controller has been added to company's Series 500 instrument line. The incorporation of the recorder and the controller into a single unit affords a 50% reduction in panel-space requirements. The recorder chart and the program cam are independently driven. This makes it possible to record repetitions of the program on a single chart. The program time may be from 30 minutes to 30 days. Various models of the instrument measure and control temperature, pressure (including absolute pressure), flow (mercury manometer or bellows-differential meter), liquid level, and humidity. Either pneumatic or electronic control is offered. Pneumatic control can be "on-off," or proportional or reset control. *Bristol Co.*

... FOR MORE DETAILS, CIRCLE NO. 310

## HANDLING SYSTEM

... both stores and conveys parts



A new system for storing as well as conveying parts, called Live-Flo is now being manufactured. The system is adaptable to nearly any application

where solid materials can be conveyed on a horizontal plane. These applications have been found in all types of industries. Multiple carriers in the system enable the storage of thousands of small parts and feed them into operations or assembly locations at a speed to meet production requirements. By using 90 degree turns, the system can often be used as a sole means of conveyance, starting with the raw material and continuing through shipping. The system is said to offer economy three ways: by reduction of handling and re-handling of parts; elimination of racks, pans and storage bins; and the provision of a continual flow of work to the point of use. Conversion units for annealing or hardening furnaces come complete, ready to set in furnace, replacing other types of conveying equipment such as pusher trays or chains of miscellaneous construction. This type of equipment allows carriers to be continually in the heat, effecting a great saving in fuel costs over the type of furnace which makes it necessary to reheat the carriers. This often reaches 50 percent of the total furnace capacity and the carriers are readily accessible for removal from the furnace. *Mathews Conveyor Co.*

... FOR MORE DETAILS, CIRCLE NO. 311

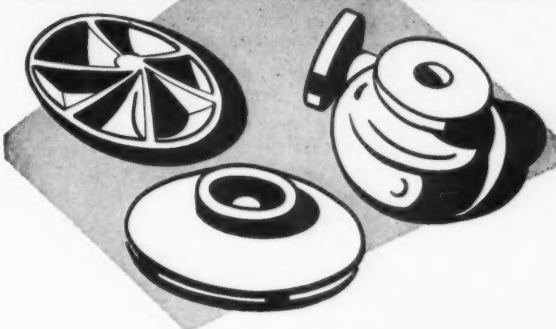
## CHAIN DRIVES

... developed for gas turbine power transmission

Chain drives have been developed for transmitting power of small gas turbine engines 30 to 1800 hp. These chains are applicable to main or auxiliary drives and are readily capable of transmitting rotating power between parallel shafts at high speed. Designated Hy-Vo (high velocity-involute sprocket), the new chain is a refinement of the silent chain principle for extremely high speeds and heavy loads. It incorporates compensating links that fully eliminate chordal action normally encountered at very high chain speeds. *Morse Chain Co.*

... FOR MORE DETAILS, CIRCLE NO. 312

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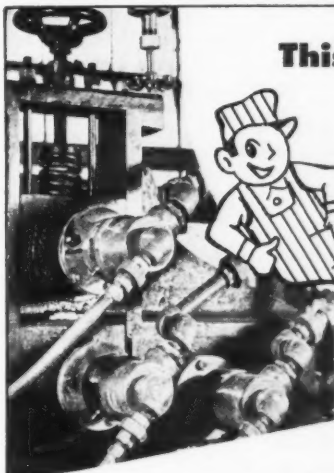
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### WIRE SHELVING

... has all-purpose use

Extend-A-Shelf, a new all-purpose industrial and commercial shelving, has found practical and labor-saving uses for both temporary or permanent storage. It is constructed from low carbon bright basic wire of .250-in. diameter. Double horizontal wires of identical quality and size are welded at 6-in. intervals between the vertical wires. A reinforcing wire is welded at the end of each section and runs diagonally the full length between the triple corner vertical cross wires. The shelves are 18, 24 and 36-in. long by either 12 or 18-in. wide, and have a welded frame .225-in diameter. Formed one inch steel bands are welded to each length of shelf. The shelves are adjustable for height of items being stored and can be extended either lengthwise or at right angles with the use of special corner brackets. One upright permits the addition of shelving from both sides, due to the 3-rail uprights. *Stanley E. Morris Co.*

... FOR MORE DETAILS, CIRCLE NO. 313

### PHOTOELECTRIC UNITS

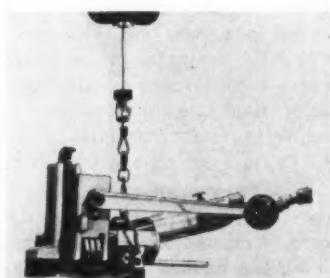
... control machine operation

Designated as "Curtain of Light" photoelectric protective equipment, units are designed for direct mounting on presses and other industrial machines, such as shears, brakes, etc. The photoelectric devices stop machine operation automatically when any part of a person's body, such as a hand or arm, enters the danger area. Equipment consists of a wide-beam modulated-light projector, a wide-beam photoelectric receiver, and a control unit. Standard "curtains" are 7, 12, and 17 inches wide. Light projector and photoelectric receiver can be mounted any distance apart up to 15 ft. Highly sensitive to partial obstruction, the control units operate when 2 inches or more of the light curtain are obstructed. *Clark Controller Co.*

... FOR MORE DETAILS, CIRCLE NO. 314

### STRETCHER - SEALER

... is lightweight, works fast



A new lightweight stretcher-sealer with air driven take up and automatic seal feed is claimed to tension, seal and score strap in less than a second. After the straps have been placed in position in the Model 2309

stretcher-sealer, the tensioning and sealing on normal size boxes takes less than a second. Loading the air tool is done quickly since the two straps are easily funneled into position simultaneously. Releasing a lever on the unit immediately drops the drive wheel into position. When the tool is properly used, tension take up is so fast the sealing operation can be started as the tensioning begins. The proper tension will be reached before the sealing handle can be swung over. As the sealing operation is completed, the next seal automatically feeds into position from a magazine of 50 seals. This new stretcher-sealer weighs less than 13 lbs., and works well in all horizontal and vertical positions. A suspension hook located at the tool's center of balance makes it easy to suspend the tool from a balancer and use it in a horizontal or vertical position. The pneumatic stretcher-sealer features a new fast U. S. Air motor that operates at 60 to 90 psi pressure according to the tension desired. When the correct tension is reached, the air motor stalls out stopping the drive wheel. A new muffler eliminates the high whine produced by most air motors, thereby reducing operator fatigue. *A. J. Gerrard & Co.*

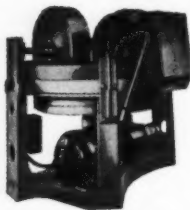
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## FERNHOLTZ HAS A COMPLETE LINE OF FOUNDRY MACHINERY

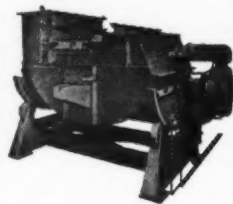
Combs Gyrotary Foundry Riddles (Great Western Mfg. Co.) Sifts, mixes, aerates and fluffs moulding and core sands, medium fine, coarse, dry and sticky materials.



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WESTERN INDUSTRY/MARCH 1961



## POWER UNITS

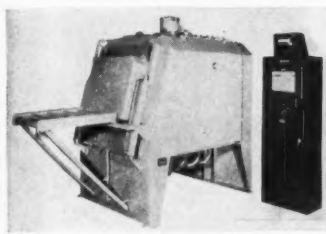
...for large material handling trucks

A new series of heavy-duty diesel-electric power units has been designed especially for use on large material handling trucks from 15,000 to 80,000 lbs. The units are said to combine low-operating cost with maintenance-free operation. Included in the new series are three models which are designed around GM diesel engine models 471, 371 and 353. Units are operated at constant speed, with variable voltage control providing the desired power output. This system eliminates use of truck contractors and resistance boxes which normally require frequent maintenance. Hydraulic power is supplied by a direct-driven pump on the engine assuring a constant source of power for all hydraulic operations. *Ready-Power Co.*

... FOR MORE DETAILS, CIRCLE NO. 316

## BOX FURNACES

... a complete line of controlled atmosphere units



The manufacture of a complete line of controlled atmosphere box furnaces is announced. Operating temperatures of 2400°F can be maintained in the smaller units, and larger units are ca-

pable of temperatures of 2250°F. The furnaces are available as gas fired, oil fired, or electrically heated units. Temperature uniformity is maintained because the charge is heated by 100% forced convection. Charging door and door plate of the tightly sealed units are of one-piece normalized cast meehanite. The castings are rigid and resist warping. Sliding surfaces are machined flat and the door is raised by dual airdraulic cylinders. Higher temperatures can be obtained because there is no alloy inside the furnace. The protected atmosphere is circulated by a ceramic fan capable of driving the atmosphere at a speed of 2500 feet per minute. Heating is accomplished by means of the alloyed ceramic heating tubes that are impervious to high carbon and high hydrogen atmospheres as well as resistant to the extreme changes of either heating or cooling. *Ipsen Industries, Inc.*

... FOR MORE DETAILS, CIRCLE NO. 317

## HYDRAULIC LIFT

...gives economical lifts up to 12-ft.

Now being introduced is a new electro-hydraulic lift that represents an economical solution to the problem of transporting loads from a lower level to a balcony or mezzanine. It is also employed in servicing the basements and street levels of many locations. The lift consists of a car traveling in a tower of channel sections, the tower constructed so that it is inclined 6° from the vertical plane. Electro-hydraulic action raises loads up to 1500 pounds to lifts up to 12 feet. Car is furnished with a bow to open hatchway doors. The platform lowers by means of gravity when a solenoid opens a valve, allowing hydraulic fluid to return to the reservoir. A flow control valve governs the rate of descent of loads, even in case of hydraulic line failure. *West Bend Equipment Co.*

... FOR MORE DETAILS, CIRCLE NO. 318



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A giant BMEWS antenna at Thule, Greenland. Vital diode crystals for the data processor were grown in an atmosphere of Airco nitrogen, monitored by an Airco-engineered system.

Faultless eyesight for America's Ballistic Missile Early Warning System depends on germanium diodes—tiny signal filtering "optics" for the data processor which are made by Clevite Transistor, Waltham, Mass. These germanium crystals are grown in a furnace atmosphere of nitrogen, and they must be of the highest quality.

Control of this quality in diode manufacture requires that the delivered gas be of utmost purity; and that this purity be held all the way from the liquid nitrogen receiver to furnace. An impurity of even a few parts per million in the nitrogen, and entrapped in the furnace-grown crystal, could cause miles of error in a field calculation.

To help make certain of the highest possible quality at the lowest possible cost, Clevite developed a gas monitoring system which Airco engineered and built to Clevite's specifications. The resulting system is so precise that it keeps watch on the purity of the Airco nitrogen right to the furnace entrance.

In every industry today, modern Airco processes based on gases are improving quality, boosting production, reducing costs.

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# Western MANUFACTURING

THE INDUSTRIAL WEST . . . ON ITS WAY

NEWS OF PLANTS — PRODUCTION — DISTRIBUTION — PERSONNEL

## Moving Ampex Tape Unit Division to Culver City

REDWOOD CITY, CALIF.—Ampex Corp. has announced plans to relocate the Tape Unit Div. of its newly-formed Ampex Computer Products Co. during the next 10 months.

The division will be transferred from its present location here to the Culver City, Calif. headquarters of Computer Products Co. The move is designed to provide for optimum utilization of the total capabilities of the Computer Products organization in the development of common products.

Culver City operations are devoted to the production and marketing of ferrite core products and core memory storage systems for the electronic data processing industry. The Tape Unit Div. designs, manufactures, and markets magnetic tape memory systems for the same industry.

## Cascade Lumber Mill Expansion Underway

YAKIMA, WASH.—Boise Cascade Corp. has undertaken a \$1,250,000 expansion program at its Yakima division, Cascade Lumber Co. mill, according to S. B. Moser, Boise Cascade vice president and general manager here.

The addition includes a high-speed planer and automatic piling and un-piling equipment to be in place by July 1, Moser said. A 640-ft. long storage and planing shed has been completed.

Five lumber drying kilns have been added as part of the present expansion program to bring drying capacity to 100,000,000 ft. of lumber annually.

## New Industry Begins Production in Chehalis

CHEHALIS, WASH.—A new industry, the Cascade Fibre Co., Inc., has begun production in the Chehalis Industrial Park here. It is a slab barker and chipper operation that utilizes

## Aerospace Center Planned For Southern California



This seven-story Aerospace Center costing about \$2,500,000 will be built in El Segundo, Calif., just across the city line from the Los Angeles International Airport. Designed especially as an office facility for use by the aerospace industry, the 104,000 sq. ft. structure features roof-top heliport levels. Owners and builders are Mr. and Mrs. Allen H. Rabin. Completion is scheduled for April, 1962. Coldwell, Banker & Co. has been named exclusive leasing agent.

waste slabs from sawmills within a 40-mile radius of Chehalis.

The industry is said to be the first of its kind on the Pacific Coast and the second in the nation.

## United Carbon to Build Plant Near Los Angeles

LOS ANGELES — The United Carbon Co. of New York will build a carbon black plant on a 45-acre site 85 miles north of Los Angeles, according to A. G. Treadgold, vice president of the company.

Construction of the plant is scheduled for completion within 10 months and production is expected by late 1961. The plant will have an initial capacity of 64,000,000 pounds annually.

Located in Kern County, the site is parallel to Highway 6 and the main line of the Southern Pacific Railroad.

## Harvill Corp. Plant Under Construction

LOS ANGELES—Construction is underway on a new \$1,300,000 manufacturing facility for Harvill Corp., the company has announced.

The 101,000 sq. ft. plant on a 7½ acre site will increase production capacity by more than a third.

The company said that it will employ many new processes and materials in the plant for its manufacture of die cast products of metal and molded plastic products.

Harvill manufactures for industrial, engineering, electronic, missile and other uses.

The modern integrated facility will be located in Rancho San Pedro Industrial Area near Compton, Calif. To be leased by Harvill on a long-term basis, the plant is scheduled for occupancy in early July.



## Salt Lake City Company Adds Paint-Making Plant

SALT LAKE CITY—Bennett's will construct a \$50,000 facility at its paint-making plant, 21st South and 2nd West, for the manufacture of synthetic resin emulsions, according to *Richard S. Bennett*, president.

The 2,900 sq. ft. structure will be ready for occupancy this month. The new plant, to produce latex emulsion paints, will also house future production of industrial products such as anti-corrosion materials for coating of pipe interiors.

## Production Underway at Air Products Co.

CARLSBAD, N. M. — New Mexico's newest industrial plant, the Air Products Co., Inc., was dedicated in public ceremonies recently.

The first 1961 AirCoupe, the light aircraft built by the company, rolled off the assembly line during the ceremony.

The City of Carlsbad purchased AirCoupe from Forney Industries, Inc., Fort Collins, Colo.

*James Hayes*, Los Angeles, is president of the firm.

## Nuclear Physicists Form New Electronics Company

LOS ANGELES—Era Research Inc., headed by nuclear physicist *Harold Hutchinson* of the University of California, here, has been organized to develop, manufacture and market new electronic devices for educational and commercial use.

Chief consultant to Era is nuclear physicist, *Dr. Kenneth MacKenzie*, also of UCLA. Dr. MacKenzie was one of the first two physicists to work with the late *Dr. Ernest Lawrence* on the Manhattan project which developed the atom bomb for the United States.

The company has established executive and sales offices in New York City and Los Angeles, and has organized manufacturing facilities in Los Angeles to manufacture a line of 12 major electronic school demonstration devices. Additional electronic equipment for use in missiles and rockets will also be manufactured.

New products designed to improve teaching methods in the sciences, engineering and foreign language courses include an Electro-Plot, an instrument system for use to plot lines surrounding charged electrodes.

Other new products manufactured by Era is a satellite balloon for school room use and an acceleration switch for the missile and rocket fields.

President Hutchinson predicts a bright and glowing future for Era Research in receiving a goodly share of the \$200,000,000 annual market that is spent by schools for scientific equipment.

## California Cartage Co. Opens Public Warehouse

LOS ANGELES—The California Cartage Co., Inc., has completed the construction of their new 40,000 sq. ft. public warehouse and the facility is in full operation, according to *Neil J. Curry*, president of the California carrier.

The new California Cartage Warehouse is located on a five-acre site at 4444 East 26th St. in Vernon, next to the company's present Los Angeles terminal. Adjacent to a 400 ft. private spur served by Santa Fe and Union Pacific railroads, the new one-story concrete and steel building accommodates the unloading of eight railroad cars at one time.

Curry indicated that the new warehouse is available for general merchandise public warehousing.



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## Bliss & Laughlin Head Probes Western Upturn

LOS ANGELES — Stating that steel inventories are at the "lowest possible" levels on the Pacific Coast, *Elven R.*



E. R. Davis

*Davis*, newly appointed general manager of Bliss & Laughlin, Pacific coast operations, said that a mere 10% boost in inventory levels could contribute to as much as a 90 day backlog of mill orders in the West.

Speaking primarily of B & L's product line, cold finished steel bars, Davis said that inventories were low in steel service centers and fabrication plants alike.

Davis indicated that his firm was making efforts to create a closer working relationship with the customer in helping him find new applications for cold bar products with emphasis on production cost cutting.

He said that great potential for business lay in stimulating the West Coast market that is not yet able to supply all its own needs for steel. As population increases, Davis foresees increasing demand for steel products from industries established to serve the Western market.

Many products that are currently assembled here are built from steel parts fabricated elsewhere, he said. Davis sees potential in a "domestic" industry that will take all-Western steel and fabricate it into finished products.

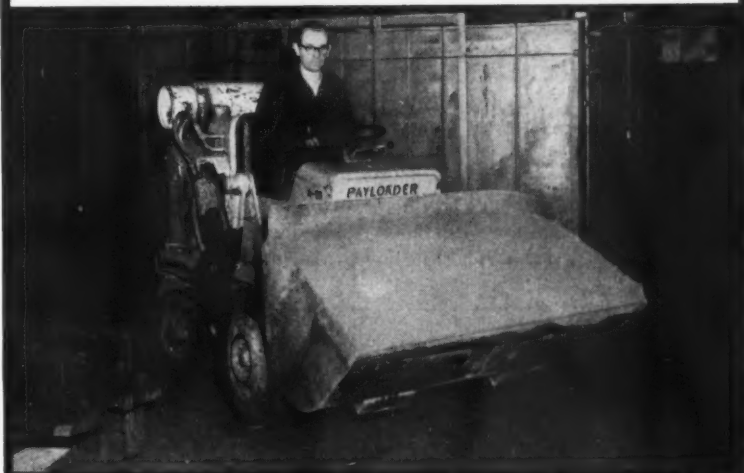
## McLaughlin Industrial Distributors New Firm

PICO RIVERA, CALIF.—*E. H. McLaughlin, Jr.*, president, has announced the formation of McLaughlin Industrial Distributors, Inc., which will specialize exclusively in industrial hardware and mill supplies for Southern California industry. The new firm has purchased the inventories of the former Union Hardware & Metal Co.

The new firm will occupy new quarters at 714 South Paramount Blvd.

According to *E. H. McLaughlin, Sr.*, chairman of the Board, "we have been very fortunate in obtaining the services of former key employees of both Union Hardware & Metal Co. and its subsidiary Metal Sales, Inc."

## PAYLOADER® handling



## helps modernize plant

One of the largest, best equipped foundry operations in the New England area belongs to Brown & Sharpe Mfg. Co., Machine Tool Division, in Providence, R. I. Since completing a thorough modernization program, they use four "PAYLOADER" tractor-shovels to move molding sand, coke and limestone and transport scrap and cast iron to various points in the foundry.

**Paul Rey, Foundry Labor foreman**, has this to say about their Model H-25 "PAYLOADER": "I find the H-25 fast and efficient . . . it has power to get the job done quick and is easy on the operator . . . its short turning radius enables the operator to work in crowded areas without damaging the floor work". They estimate the H-25 handles about 20 tons of sand per hour, working within a maximum 500 lineal foot haul.

**Mobility, speed and operating ease** are familiar trademarks of the H-25. With only 6-ft. turning radius, it features 2,500-lb. operating capacity, *complete* power-shift transmission, torque converter drive, power-steering, power-transfer differential and fast, powerful hydraulic bucket control. A closed, pressure-controlled hydraulic system, and filters and seals throughout the machine, protect its mechanical and electric parts from damage due to dust, moisture and corrosion.

**If you want to modernize** and increase output on your plant bulk handling operations, make it a point to talk "PAYLOADER" with a Hough Distributor nearby. There's money-saving performance built into all "PAYLOADER" units . . . and there are 8 sizes and 20 models (up to 12,000-lb. operating capacity) to fit every material handling need. Contact your distributor today, or write for more details.

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3-A-2

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### Sun-Maid Raisin Growers Plan \$3,000,000 Plant

FRESNO, CALIF. — *Walter K. Hines*, general manager Sun-Maid Raisin Growers, here, has announced plans for a new \$3,000,000 plant on a 53-acre site at Bethel Ave. and the Golden State Highway between Kingsbury and Selma, Calif.

Construction is scheduled to begin in August. The Fresno facility will be moved to the new plant upon its completion which is expected in July, 1962.

### Alaskan Aircraft Supply Opens Anchorage Facility

ANCHORAGE — The Alaskan Aircraft Supply opened a 4,800 sq. ft. concrete block structure at 4707 Spenard Drive this month to serve the air industry here.

As distributor for several major equipment manufacturers, the firm carries a large stock of aircraft parts and equipment. In addition there are shop facilities for equipment and instrument overhaul.

### Union Oil Subsidiary Expanding Facilities

LOS ANGELES — Collier Carbon & Chemical Corp., a Union Oil subsidiary, here, is expanding its facilities, its products and its markets in a diversification move, according to a recent announcement by the parent organization.

New plants adjacent to Union's Los Angeles and Oleum refineries have begun converting refinery by-products into more valuable and saleable materials.

The new Los Angeles plant has a 250-ton-per-day capacity for converting alkylation acid, hydrogen sulfide and sulfur into sulfuric acid. A portion of the acid is used for the manufacture of ammonium sulphate. Sulfuric acid will also be supplied to Union for use in making high octane fuel.

Adjacent to Oleum refinery, Collier has begun operation of a \$2,000,000 plant to use Union's petroleum coke and other raw materials. This plant converts "raw" or green coke, a refining by-product, into high grade calcined carbon which is a valuable component of the anodes used in the manufacture of aluminum.

### FMC Forms Machinery Facility in Japan

SAN JOSE, CALIF. — Establishment of Food Machinery (Japan) Ltd., by Food Machinery and Chemical Corp. here, and Toyo Seikan Kaisha, Ltd. Japanese can manufacturer, gives FMC its first machinery manufacturing operation in the Far East.

Formal approval of the joint participation has been granted by the Japanese Government, according to FMC officials. Among the directors of the new Tokyo manufacturing company are *T. Takasaki*, Japanese statesman and chairman of Toyo Seikan; *A. Wayne Elwood*, president of FMC International, a division of FMC; and *Hubert L. Byrd*, executive vice president of FMC's machinery divisions.

The new facility will produce food canning, processing and packaging machinery, fresh produce packing equipment, and related products under an extensive license agreement. Local management service and manufacturing personnel will be provided by Toyo Seikan.



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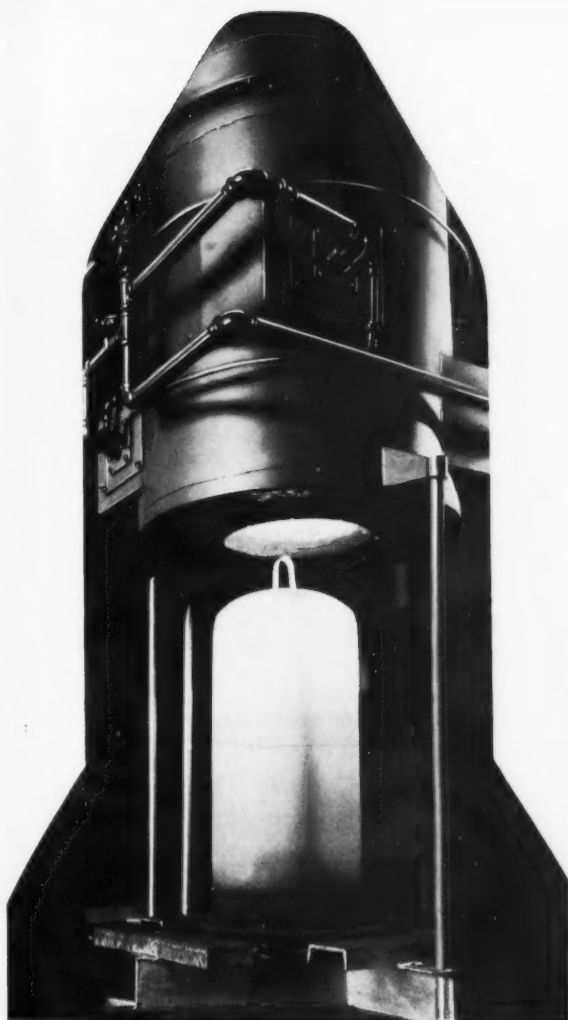
- Diaphragm pumps
- Centrifugal pumps
- PACO Turbine-type pumps
- Rotary pumps



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*Another Example of  
Modern Gas Technology:*

## High-Temperature "Incubator" for America's Missile Parts

Test launchings for missiles may be held at Cape Canaveral, Florida, but the first "count down" often takes place at Montebello, California. That's where Metallurgical Consultants, Inc. brazes missile parts in a Gas-fired furnace. Temperatures within the furnace can reach 2,150°F. Nickel, or gold brazing alloys are used to join the parts to form vital mechanisms like rotor and nozzle assemblies. When brazing is completed, these assemblies must function perfectly and be able to withstand the terrific stresses and temperatures encountered during high speed missile flight.

At MCI, missile parts are brazed in a Gas-fired furnace nicknamed "Work Horse." A well earned title, according to MCI vice president John J. Lawless, Jr. He reports that the recently installed Gas furnace can braze up to 8 loads a day. As a result, the plant's high heat processing capacity has increased 50 percent. Gas was chosen to power the furnace because high temperatures are reached easier and faster with Gas — at a lower cost. And Gas heat is more controllable.

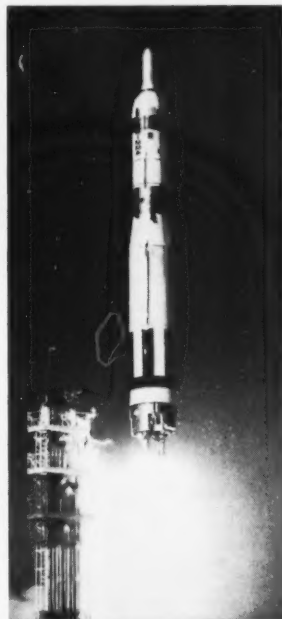
Gas can mean extra efficiency for high temperature equipment in your plant. At greater economy, too. When it comes to heat processing, your Gas Company representative has all the facts. Call him soon.



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87-5

The Atlas (lower left) and the Titan Intercontinental Ballistic Missiles leave the launching pad. Aboard both are parts that were brazed in MCI's "Work Horse" furnace.



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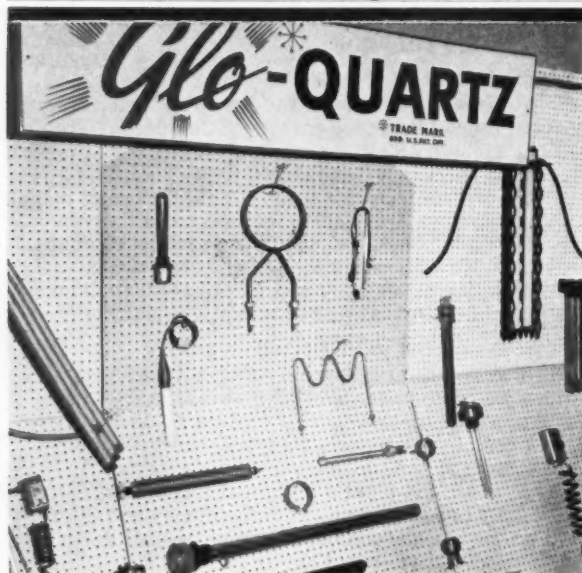
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## Del Names Haskel Engineering Industrial Seal Distributor



Los Angeles—Named exclusive agent in 11 Western states for industrial seals made by Del Mfg., Haskel Engineering & Supply representatives will both distribute and appoint manufacturers representatives to handle the product. Shown during signing of contracts are, from left, Richard L. Hayman, Haskel president; Manuel Delgado, seated, Del vice president and general manager. Looking on is Gilbert Rommel, Del sales manager. Haskel, manufacturers of hydraulic and pneumatic equipment for industrial use, has Glendale and San Francisco, Calif., offices.

## Century 21 Exposition To Hold Industrial Exhibits

LOS ANGELES — Spokesmen for the forthcoming Seattle, Washington Century 21 Exposition, scheduled April 21 through October 21, 1962, presented an informational program for Southland industrialists and the trade press at Los Angeles Statler-Hilton with emphasis on "commerce and industry" exhibits.

Mayor Norris Poulson, Los Angeles, and Mayor Gordon S. Clinton, Seattle, joined with Los Angeles Chamber of Commerce president Harold C. McClellan during the program that outlined attractions for an anticipated 10 million visitors.

Using slides and motion pictures, news analyst William Winter took Los Angeles guests on a tour of the exposition site that will include the first high-speed mass transit monorail, and areas that will feature indoor and open air industrial exhibits.

## A. M. Castle & Co. Appointed Pioneer Aluminum Distributor

LOS ANGELES — A. M. Castle & Co., steel and aluminum distributors, have been appointed as representatives for Pioneer 921-T-DC aluminum tooling plate, according to an announcement by Wm. F. Morrow, vice president, Pioneer Aluminum, Inc.



## Roi Gears Housewarms New \$250,000 Addition



PASADENA, CALIF.—Rogers & Oling, Inc. and its subsidiary, Roi Gears, Inc., recently held an open house to celebrate the completion of the company's new two-story, \$250,000 addition at 2670 East Walnut St., here.

Guests shown looking over Barber-Colman gear hobber are, left to right, *Cliff Malamphey*, *Virginia Kurtz*, of Rogers & Oling, *Mrs. Truman Stivers*, *Betty White* and *Owen Mathes*, of Consolidated Electrodynamics Corp.

## Anderson-O'Brien Opens City of Industry Plant

LOS ANGELES—Anderson-O'Brien Co., Southern Calif. distributors for Detroit Diesel Engine Div., General Motors, held open house ceremonies at their 21,000 sq. ft. plant devoted to production of diesel powered generating sets, rebuilding, servicing and installation of diesel engines.

The new tilt-up concrete industrial structure is situated on a two-acre site. The plant is equipped with a 300 hp Clayton chassis dynamometer, Bacharach engine rebuild stands, an environmentally controlled injector and fuel pump rebuilding room, and a DeVilbiss water-wash paint spray booth.

The firm maintains branches in San Pedro, El Cajon, Calif., and dealerships in Ventura, Calif.

## Warren Pumps, Inc. Appoints Los Angeles Representative

LOS ANGELES — Warren Pumps, Inc. of Warren, Mass., has appointed *Paul L. Armstrong* industrial sales representative for Southern California, Arizona and Clark County in Nevada. The Armstrong firm is located at 1709 West Eighth St., here.

## Southland Chevrolet Plant Plans Facility Expansion

VAN NUYS, CALIF.—Enlargement of the Chevrolet plant located in the San Fernando Valley, near Los Angeles has been announced. Expanded facilities will be devoted to production of full-size automobiles for the 13 Western state market, according to company spokesmen.

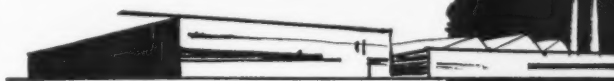
The move was made since the Oakland, Calif. Chevrolet plant, at one time producing full size models, has been converted to exclusive production of compact cars and trucks.

## California Leads West In Manufacturing Plants

LOS ANGELES—California leads all other Western states in the number of manufacturing plants, according to recent statistics released by Citizens National Bank.

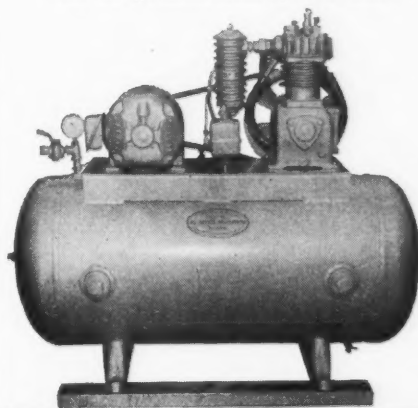
Their latest census of manufacturers shows that over 28,000 of the 46,000 plants in the West are located in the Golden State. In the period between 1954 and 1958 a net gain of 4051 plants was credited to the 11 state area with California accounting for 3881 of the total.

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## U. S. Rubber To Expand Los Angeles Plant



Grouped around a tire from the expanding Los Angeles plant of US Rubber Co. are, from left, G. R. Cuthbertson, vice president and general manager, tire division; J. R. Achilles, Los Angeles district sales manager, US tires; and Bud Harvey, Western regional sales manager, US tires.

LOS ANGELES — G. R. Cuthbertson, vice president and general manager of the US Rubber Co., tire division, has announced a \$6,000,000 expansion program in the next five years that will produce tires for 28 operational and projected tire outlets run by the firm in the greater metropolitan area.

Cuthbertson made the announcement at a Los Angeles trade press conference and said the Los Angeles

plant would double 1961 expenditures to begin a modernization and new equipment program to "substantially" increase current output.

Commercial and industrial consumption of tires for trucks was rated at 277,000 units for 1961 by Cuthbertson who added that this segment of the market contributed strongly to an estimated 2,400,000 retreaded units forecasted this year.

He added that company forecasts see a \$140,000,000 market for this product by 1965, an increase of slightly more than 27 per cent over current volume.

In regard to new compounds for heavy duty truck and industrial tires, Cuthbertson said that company laboratories "discover" about 1000 formulas yearly, that about 100 are evaluated and about 10 are adapted for use.

## Kaiser Steel Reopens Fontana Blast Furnaces

FONTANA, CALIF. — Recent reopening of two open hearth furnaces for a short period has resulted in calling back of 92 workers to aid in a inven-

tory buildup program at the Kaiser Fontana mill.

Reopening places all five open hearth units in operation. Work force at the mill is currently about 6,800.

## White Motor Appoints San Diego Distributor



Howard P. Strother, manager of the White Motor Co.'s Los Angeles factory branch, left, and Art W. Lang, new White distributor for the San Diego area, look over the contract appointing Lang's San Diego White Truck Co. to handle sales and service for White, Autocar and White-Freightliner trucks. The new distributor will maintain a complete inventory of parts and necessary equipment to service all White products as well as other makes of trucks.

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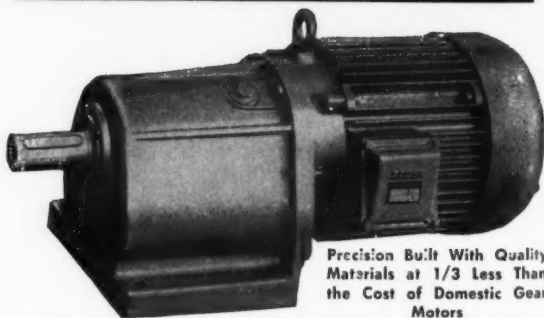
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WESTERN INDUSTRY/MARCH 1961

## Jorgensen Housewarms New Honolulu Center



Earle Jorgensen greets Henry J. Kaiser, left, at opening of Jorgensen Honolulu Service Center last month. Over 300 people representing local business and industry attended the opening which was hosted by company President Jorgensen, District Manager Paul Childs and Honolulu Branch Manager Frank Gregory. The Jorgensen Co., with headquarters in Los Angeles, is a distributor of Kaiser steel and aluminum products.

## Spectromagnetic Moves To New Hayward Plant

HAYWARD, CALIF. — Spectromagnetic Industries has moved from San Carlos, Calif. to a new factory with over three times the working area at 25393 Huntwood Ave., here. A larger plant was necessary to handle heavy production schedules, according to Donald R. Klein, president.

Founded in 1958 to supply complete design and fabrication services of special electromagnetics devices for the government, industrial and academic research laboratories, the company's line has grown to include: single or multi-port analyzing and deflecting magnets, large solid-angle spectrometers and broad range spectrographs, voltage and current regulated power supplies, multiple magnet systems involving magneto-optical design, quadrupoles and quadrupole systems, air core solenoids, and custom coils.

## California Packing Corp. Adding Large Warehouse

SAN LEANDRO, CALIF.—A new warehouse to cost about \$600,000 will be built by the California Packing Corp., Plant 8, according to a recent announcement. The warehouse, to comprise 35,000 sq. ft., will be constructed on a recently acquired 3.2-acre site across the street from Plant 8. John F. Tulloch, Inc., has the building contract.

# BALL VALVES

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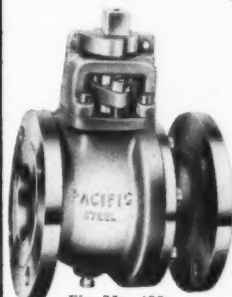
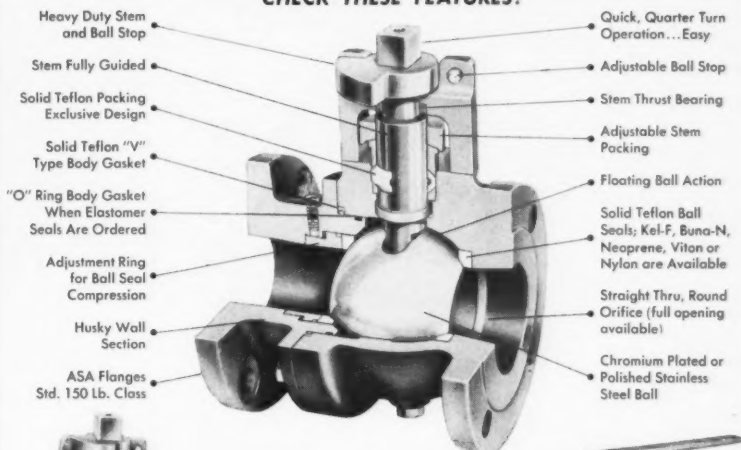


Fig. No. 400  
Flanged Ends  
150 lb. Series  
Sizes — 2½" thru 12"



Fig. No. 225  
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Up to 1000 Lbs.  
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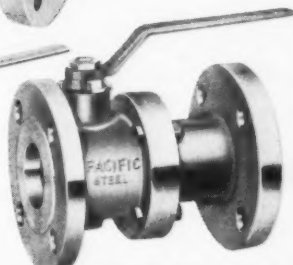


Fig. No. 400  
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Sizes — ½" thru 2"

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Pacific offers a complete line of valve actuators including its exclusive "PneuRotor"®, a pneumatic rotary operator mounted directly on the valve.

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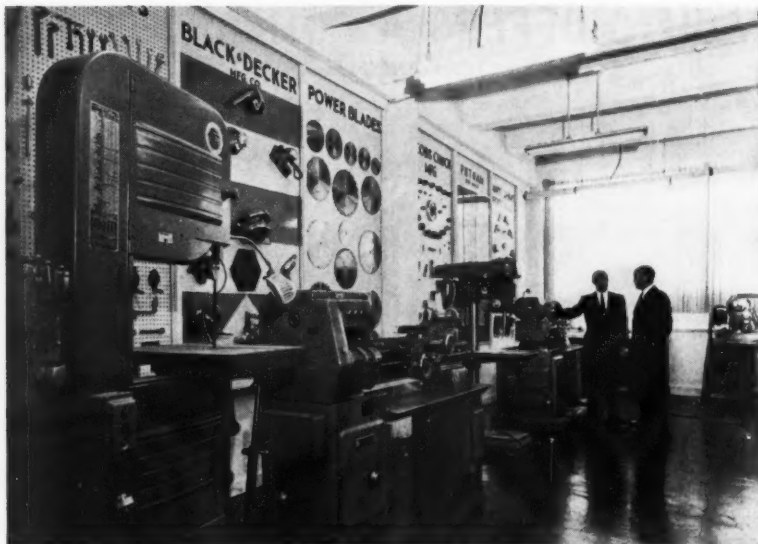
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## Marwedel Opens Bay Area Display Facilities



Standing in new demonstration and display room recently opened by Marwedel in San Francisco are Elmer Berryman, left, and George McClaskey, machinery and power tool specialists with the firm. Marwedel, a subsidiary of Garrett Corp., distributes a complete line of machine tools and accessories. Machinery including drill presses, lathes, band saws, grinding, drilling, tapping and honing units, are set-up for customer operation. Marwedel distributes to the Northern California area.

### American Can Co. Plants Readied For Production

PORTLAND — The American Can Co. has announced that equipment installation is underway at the firm's Astoria, Ore., plant and is nearing completion at the new plant in West Eugene, Ore.

The company's schedule calls for completion of employee training and equipment testing at Eugene in time for production to start this month. The firm expects to attain full-scale production at Astoria by mid-March or early April.

Each of the two plants will have a rated production capacity of 100 million containers annually and 20 persons initially with employment to increase to 50 persons at each plant eventually.

Located at 645 Seneca Rd., the Eugene plant occupies 70,000 sq. ft. of floor space. The plant is expected to produce cans the year around, with maximum output scheduled in the pre-harvest season. The Eugene Fruit Growers Association will be the plant's major user.

The Astoria facility, with 55,000 sq. ft. of floor space, is located on Marine Dr., east of the Columbia River Packers Association plant. It will make containers for fish and seafood products.

### Hayward Firm Acquired By Royal Industries

LOS ANGELES — Royal Industries, Inc., here, has expanded its activities in the nuclear field with the acquisition of Dublin Industries, Inc., of Hayward, Calif., it was announced recently by J. R. Johnson, Royal president.

Dublin Industries is engaged in nuclear research and analysis. Royal designs and manufactures precision equipment for the nuclear and aerospace industries.

The transaction involved an exchange of stock, Johnson stated.

"Our present hydro-mechanical capabilities in the nuclear field will be complemented by Dublin's activity in physical chemistry," he said. "Moreover, this will permit joint ventures with our Vard Division which produces control rod mechanisms and other equipment for nuclear reactors."

Dublin will be operated as a subsidiary of Royal Industries under the name Royal Research Corp., and will continue under the direction of its president, Dr. W. T. Crane.

Founded in February, 1959, the new subsidiary is conducting work in isotopic power, analytical research and development, and nuclear hazards evaluation. It also designs and manufactures enclosures for the safe handling of hazardous materials.

### AEC Reactor Experiment for Civilian Power Uses

IDAHO FALLS, IDAHO — The Atomic Energy Commission will build a reactor experiment at the Commission's National Reactor Testing Station, here, designed to provide data on the use of gas-cooled reactors for maritime and other civilian power applications.

A program for the design, construction, and test operation of the facility, designated Beryllium Oxide Reactor Experiment (BORE), has been assigned by the Commission to the General Atomic Div. of the General Dynamics Corp., San Diego, Calif. The work will be performed by the General Atomic Div. as part of its assignment under the Commission's program to develop a closed-cycle, gas turbine marine propulsion plant powered by a high temperature, helium-cooled, beryllium oxide-moderated reactor.

The reactor will be fueled with a mixture of uranium oxide and beryllium oxide. Such a propulsion system offers potential advantages in economy, weight, compactness, and inherent safety. Conceptual design for the reactor experiment was prepared by General Atomics.

### Marwais and Reynolds To Warehouse Aluminum

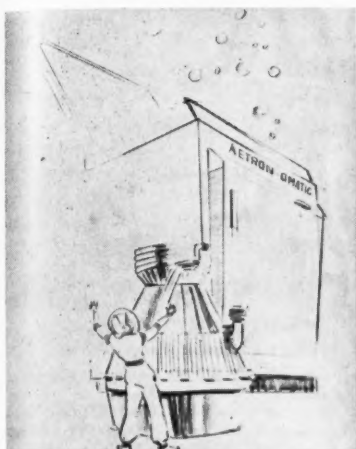
LOS ANGELES — Marwais Steel Co., West Coast metals distributor, and Reynolds Metals Co. have teamed to provide warehousing facilities for aluminum mill products for use in architectural, commercial and industrial construction.

The joint announcement was made by Marshall I. Wais, president of Marwais, and W. O. Yates, vice president of Reynolds Aluminum Sales Co. and Pacific regional general sales manager of Reynolds Metals Co. Wais also announced the appointment of G. Courtney Yager as manager of the new aluminum division of Marwais Steel.

Marwais plans to have warehousing facilities in both the Los Angeles and Bay areas. In Los Angeles, the aluminum products will occupy approximately 70,000 sq. ft. in Marwais' new building at 6466 Gayhart St. in the Central Manufacturing District. In the Bay Area, the warehouse will be in a 40,000 sq. ft. structure constructed adjacent to Marwais' present facilities in Richmond, Calif.



## Aetron Designs Missile Motor Washing Machine



COVINA, CALIF.—An enormous washing machine some 40-ft. by 20-ft. by 18-ft. high on the design boards at AETRON Div., Aerojet-General Corp. and when built will wash rocket engines with the same multi-cycle action as the housewives' kitchen dishwasher.

Rocket power plants will be pre-rinsed, washed, rinsed and dried in the king-sized unit that even has a receptacle to hold cleaning detergents. Decontamination demands are so high that AETRON spokesmen say the rinse cycle will use only de-mineralized water. This will help assure that the engine is cleaned of all dirt and acid residues collected during its manufacture and test firing.

## Universal Molding Adds Roll-Forming Machine

LYNWOOD, CALIF.—Universal Molding Co., here, fabricators of roll-formed aluminum angles, channels and tubing for industrial applications, has increased its capacity 20 per cent with the installation of its second custom-designed roll-forming machine within a year.

Cliff W. Pratt, president, said the installation was required to catch up with the increased demand for its roll-formed products. The latest machine, representing a \$20,000 investment, is designed specifically for more complex roll-forming operations and will be used largely in the production of enclosure components.

"Since the first of the year," Pratt said, "the metalworking industry in general has shown a marked upturn."

## Union Carbide Nuclear Co. Closes Green River Plant

GREEN RIVER, UTAH—Union Carbide Nuclear Co. closed its uranium ore up-grading plant here on Feb. 25.

The facility had 34 employees and began operation in January 1958.

J. L. Lake, manager of UCN's Colorado Plateau operations, said the company's ore and that from independent producers in the eastern Utah region will be shipped to Rifle, Colo., and to the firm's plant at Uravan, Colo.

## Mobil Oil Company To Continue Exploration

SANTA MONICA, CALIF.—Mobil Oil Co. has continued a contract with the city of Santa Monica calling for exploration and production of oil from areas within the city tidelands, according to L. C. Stevens, vice president of the firm's Los Angeles exploration and producing division.

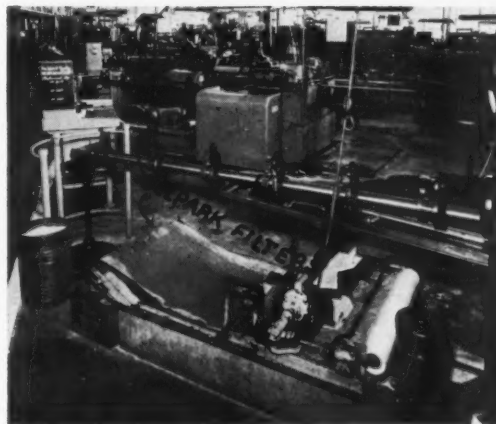
Mobil, under the \$50,000 contract, has been employed by the city since 1954 as a contractor to develop the petroleum resources of the tidelands.

## MONTGOMERY BROTHERS, INC.

ENGINEERING REPORT  
No. 10

CLIENT: A Large Westcoast Pump  
Manufacturer

PRODUCT: CFC Delpark Filters



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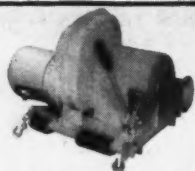
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*John J. Terlep, Sales Manager*

**REGARDLESS OF THE SIZE AND  
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FLUID TYPE LUBRICANTS WILL  
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## New Los Angeles Facility For Rucker Hydraulics



The Rucker Co.'s new facility at 6170 Telegraph Rd., Los Angeles, represents the fourth successive move to larger quarters made by the company since opening its Los Angeles offices in 1948. The Rucker Co., with headquarters in Oakland, Calif., distributes hydraulic and pneumatic components and manufactures centrifuge acceleration test machines, power and control package systems and missile ground support equipment.

LOS ANGELES—The Rucker Co. moved into its newly constructed Southern California District sales and service facility last month at 6170 Telegraph Rd., adjacent to the Santa Ana Freeway. The 13,000 sq. ft. structure provides greatly increased facilities for engineering services, warehousing, testing, sales and service, according to *Clark E. Rucker*, president.

The new building is provided with sun control louvers and acoustical ceilings.

*Thomas S. Cozzens* is the newly appointed Southern California sales manager, replacing *Donald A. Anderson* who was recently promoted to the newly created position of assistant to the vice president, with headquarters in Oakland, Calif.

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WESTERN INDUSTRY/MARCH 1961

## Cleveland Cap Screw in New Expanded Quarters

SOUTH SAN FRANCISCO — The Cleveland Cap Screw Co., manufacturers of cap and set screws, bolts and socket products, has announced relocation of its Northern California sales office and warehouse to a new, 26,000 sq. ft. building in the Utah Construction & Mining Co.'s Industrial Park here.

John E. Harrington, general manager of the company's West Coast operations, said the move from 415 Eccles Ave., here, to the expanded facilities was made to meet the demands of a growing Western market.

From the new \$250,000 facility at 352 Harbor Way, the company will serve Northern California, Oregon, Washington, Montana, Idaho and Nevada.

## Lenkirk Electric Co. Expanding Facilities

SAN CARLOS, CALIF.—Plans for an addition of approximately 94,000 sq. ft. to its manufacturing building at Howard Ave. and Industrial Rd., here, have been announced by the Lenkirk Electric Co., Inc.

About 82,000 sq. ft. of the proposed new building will be designed for development engineering offices and laboratories, according to the announcement.

Cost of the project, currently under study by San Francisco architect John S. Bolles, is approximately \$1,250,000.

Lenkirk Electric, a subsidiary of General Telephone & Electronics, manufactures electronic telecommunications equipment.

## Construction Slated by Thiokol and Air Force

OGDEN, UTAH—About \$39,000,000 in new construction will be spent at the Thiokol Chemical Corp. rocket facilities in Box Elder County in 1961, reports Joseph W. Crosby, president.

Of this amount \$4,000,000 will be put up by Thiokol, the other \$35,000,000 by the Air Force, for construction of the firm's Wasatch division plant for production of the Minuteman missile first stage.

Thiokol's investment in the Northern Utah rocket facilities in Box Elder County is now \$12,258,000 with an AF investment of \$14,783,000.



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## Mathews Conveyor West Plant Under Construction



Artists drawing of \$800,000 plant which is now under construction for Mathews Conveyor Co. West Coast, at Chico, Calif. The manufacturer of gravity and power conveyers and special conveying machinery outgrew its present facility at San Carlos, Calif. The new plant, located on a 40-acre site, will consist of 78,000 sq. ft. of manufacturing space. The Engineering Departments and executive offices will remain in the San Francisco Bay Area, however, not at the present San Carlos facilities.

### Lear, Inc., To Make Annual Air Traffic Safety Award

BEVERLY HILLS, CALIF. — *William P. Lear*, chairman of Lear, Inc., here, has announced the establishment of an annual award for the most significant achievement in the field of air traffic safety.

The award will be given to honor the person, persons, or organization in the United States or foreign countries making the most lasting contributions to air traffic safety.

### CF&I Modernization of Pueblo Mill Completed

DENVER — Modernization of the 14-inch rolling mill at the Pueblo plant of the Colorado Fuel & Iron Corp. has been completed and is operating under a 3-shift basis, it was reported recently.

The mill, installed originally in 1907 for the production of mine rails, now is the busiest facility at the plant, rolling more than 350 different products, company officials announced.

## Tubular Structures In Expansion Move

LOS ANGELES — Tubular Structures Corp. of America, manufacturers of Mayco and Waco products for the construction and material handling industries, and Tube-Strut Corp., clamp manufacturers, have moved into expanded office and production facilities at 4560 Sperry St., here, and named several appointments to their staffs.

The firms will occupy two buildings at present: one, 18,000 sq. ft., for plant facilities, and an adjacent 8,000 sq. ft. edifice for general offices. In a joint announcement, President *Marvin M. May* and Vice President and General Manager *George M. Adler* said that plans were being finalized for construction of an additional 8,000 sq. ft. building.

New appointments include: *Michael Grunfeld*, chief engineer, who will head the R&D team as well as product engineering; *Dick Henneuse*, project engineer; *Jay Stine*, sales manager, Shoring and Scaffolding Div.; and *Gunther Piepers*, sales engineer, Mayco-Weitz Tower Crane Div.

## Boeing Seeks Acreage For Space Age Research

SALEM, ORE. — To provide a testing site for future missile and space projects the Boeing Co., Seattle, is negotiating for a lease on the 100,000-acre Boardman Space Age industrial park in Morrow County, Oregon.

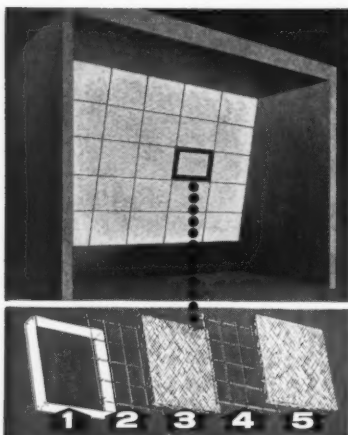
Oregon Governor *Mark O. Hatfield* announced last month that the State had received an application from Boeing for lease of the area. The lease would be for a total of 80 years, and provides that Boeing shall use the site for industrial, research and industrial purposes. Annual rental would be \$60,000, adjusted at 10-year intervals to reflect inflationary factors. A clause provides that the state has the option to terminate the lease if the specified use does not develop by Dec. 31, 1966.

The tract is the former Navy practice bombing range.

## Plant to Fabricate Steel Equipment for Feed Mills

DENVER — *Verland Fiscus*, owner, has announced opening of a factory to fabricate steel equipment for feed mills at 7091 Brighton Blvd., here.

The Fiscus Feed Mill Equipment Co. designs and builds the equipment.



A Paint Arrestor module consists of a Holding Frame (1), two Snap-in Grids (2 and 4), two Paint Arrestors (3 and 5). Loaded Paint Arrestors are simply replaced as necessary. And, they're also ideal for air-borne ink, mist, dye, frit, etc.

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• FRESNO (AM 6-5898)

• PORTLAND (CA 6-4827)

• SPOKANE (MA 4-8058)

• SACRAMENTO (GI 1-3796)

... for more details, circle No. 66 on Reader Service Postcard



## Construction Underway On Federal-Mogul Plant

LOS ALAMITOS, CALIF. — Construction is underway on a new plant for the Federal-Mogul-Bower Bearings, Inc., aircraft-missile components division, President G. S. Peppiatt reported last month.

The first unit of the new Arrowhead Products Div. facility here, will itself amount to a nearly 50 per cent increase in floor space over the present outgrown plant some 10 miles away at Long Beach, Calif. Operations and employees will be transferred to the new plant when it is completed next Sept. 1.

Arrowhead Products is a supplier of plastic and stainless steel components for the aircraft-missile industry, and holds a production contract for a pressurized "space suit" developed for the U. S. Navy.

The 100,000-sq.-ft., tilt-up structure will be constructed on a 14-acre site and will house manufacturing, office and laboratory facilities.

## Texaco Building Hawaii Aircraft Fueling System

HONOLULU — Texaco, Inc., has begun construction of a new high-speed hydrant aircraft-fueling system at the Honolulu International Airport, according to James W. Kinnear, Texaco's Hawaii manager.

Scheduled for completion late this year, the project is designed to service four aircraft simultaneously with either jet fuel or regular aviation gasoline.

The system consists of storage tanks, pumps, meters and more than 10,000 ft. of eight-inch underground pipeline to carry fuel to 19 different parking positions at the airport.

An Idaho construction company with branch offices here, Morris-Knudsen Co., has been awarded a contract for initial work on the system, Kinnear said.

## Infilco Acquired by General American Transportation Co.

TUCSON, ARIZ.—Infilco Inc., here, designers and manufacturers of water and waste equipment, has been acquired by the General American Transportation Corp., complementing the operations of the process equipment, plate and welding, and field erection divisions of the corporation.

# NEW *Snap-on* 128-PAGE TOOL CATALOG



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- PHOENIX (BR 5-2489)
- HONOLULU (86-6665)
- BUTTE (2-8762)

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**TOWMOTOR** Naro-Isle Stack Fork Lift maneuvers a load for onlookers. R. L. Fairbank, vice president Towmotor Corp., left, discusses liquid driven transmission with N. K. Brothers, a Gerlinger Carrier Co. official of Dallas, Ore.



**CHAINVEYOR CORP.** demonstrates overhead conveyor system in full operation. Patrick Rau, President, and C. L. Long of Los Angeles office look on.



**OUTSTANDING FEATURES** of this new "Thirty" type battery for electric truck service are explained by R. H. Carver, manager field engineering, Gould-National Batteries, Inc., Oakland, Calif. and Ken Brown, Specification engineer, Oakland office.

## HIGHLIGHTS

### Pacific Coast MHI Show

Exhibitors at the San Francisco Cow Palace emphasized engineering and problem solving aspects of material handling.

OVER FIFTEEN HUNDRED WESTERN industrial men turned their backs on golf, boating and other leisure activities on Washington's Birthday to spend their holiday visiting first day of the Material Handling Institute Pacific Coast Show at San Francisco's Cow Palace. They came from throughout the 13 Western states and during the three-day show officials estimated some 8,000 people inspected the hundreds of products on display and sat in on technical meetings that augmented the equipment displays.

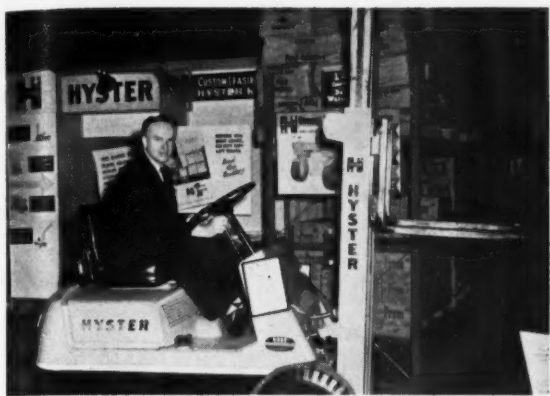
Industrial material handling and protective packaging equipment made by over 115 nationally-known manufacturers was displayed and demonstrated.

Badges worn by visitors reflected attendance by both top and middle management. Stanford University, Palo Alto, Calif. and the University of California at Berkeley sent bus loads of their industrial engineering students and faculty.

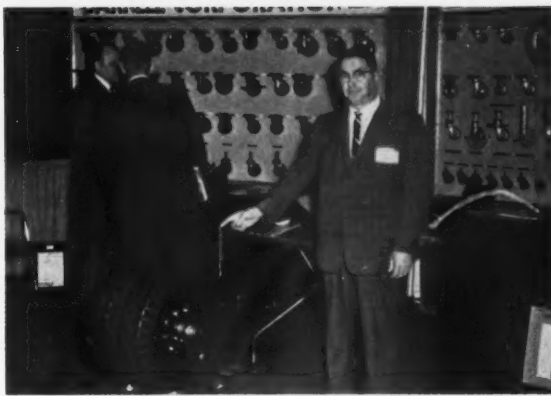
Emphasis of the show was on the application and problem solving aspects of material handling, rather than simply a display of machinery, explained B. E. Phillips, show committee chairman, first vice president of the Material Handling Institute, and a vice president of Clark Equipment Co., Battle Creek, Mich.



**DEMONSTRATING MOTOROLA's** new transistorized "handie talkie" pocket transmitter are Claude C. Davis, radio communications representative, San Carlos, Calif. and Harry Harrison, Chicago office.



*HYSTER CO.'s sales promotion manager George Green, Portland, mans Challenger 25 lift truck in demonstration of space saving features of the 2,500-lb. capacity pneumatic.*



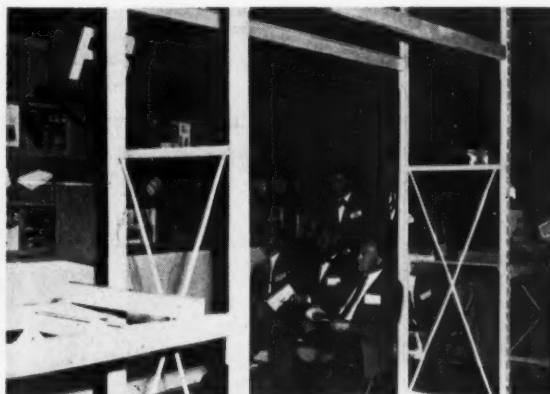
*DARNELL CORP. LTD.'s factory representative Thomas A. Watson, Downey, Calif., describes new heavy-duty dual-wheel pneumatic caster capable of handling 4,000 lbs.*



*M. A. TRAVIS, Green-Penny Co. Multi Rack systems div. manager, Los Angeles, demonstrates an adjustable cantilever type arm rack that can be moved in a few seconds without tools.*



*L. W. GOLDENSON, Yale & Towne Mfg. Co., watches demonstration of new G-5 200 fork lift truck with four 96-in. forks carrying four pallet loads weighing close to seven tons.*



*ONLOOKERS watch Palmer Shile motion picture about racks. Included are W. L. Murphy and H. C. Ballard, Bethlehem Steel; Palmer Shile Representative; A. B. Zerkoss and Capt. E. K. Scofield, U. S. Navy, and Bill Wooldridge, W. F. Wooldridge Co.*



*J. L. CHOICE, industrial sales manager Lamson Corp. Western Div., San Francisco, points to snap-out roll feature of conveyors which permits instantaneous removal of rolls by pressure at end of shaft.*

(Continued on page 100)

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SCIENTIFIC!**

## **NEW PARTLOW MFS TEMPERATURE CONTROL**



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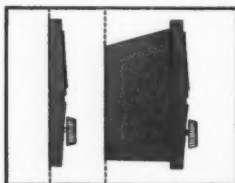
Good looks are only part of the story of Partlow's spectacular new control! The MFS is rugged and efficient, its tough mercury-actuated element built to retain sensitivity and accuracy even under extreme conditions. Convenient, too! You can interchange the mercury element right out in the field . . . no factory adjustment required.

The MFS comes in 10 scale ranges. Accurate within  $\frac{1}{2}$  of 1% of scale range, it is especially adaptable to control applications where temperature variations must be kept at a minimum; or where sudden temperature changes demand instant response.

If your product or process requires close, positive temperature control within the  $-30^{\circ}\text{F.}$  to  $1100^{\circ}\text{F.}$  range, you are invited to test this new instrument soon. Call or write Pacific Scientific Company for complete information.



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100



**DEMONSTRATING TREAD** lock brake for medium duty casters to Stanley E. Larsen, R. H. Brown Co., right, are A. S. Coorlim of Colson Corp., Chicago, and Bill Ruppel, assistant district manager, Colson Equipment & Supply Co., San Francisco.



**NEW POWRMITE 30** is demonstrated by pretty model Angela Michaels, at Clark Equipment booth. Unit is electric powered with 3,000-lb. capacity.



**M. E. HILLMAN**, left, of Republic Electric & Development Co., Seattle, views operation of **Magnetat Memory System** with **William G. Sea**, a Southern California distributor representative.



## Union City Glass Depot Underway for W. P. Fuller

SAN FRANCISCO — Ground was broken in Union City, Alameda County, this month for a new Northern California glass depot for W. P. Fuller & Co., according to an announcement by W. P. Fuller Brawner, president of the San Francisco based paint and glass firm.

Upon completion, land, buildings and equipment will represent an investment of between \$500,000 and \$600,000, and the facility will serve as a distribution center for flat glass, auto glass, glass and aluminum doors and windows and other glass products.

D. E. Lindsay, manager of engineering for Fuller, said that the warehouse will cover 67,200 sq. ft. and the office area 5,800 sq. ft. The property covers 17 acres. Occupancy is scheduled for mid-year.

## U.S. Steel Buys Nevada Iron Ore Properties

SAN FRANCISCO—Purchase of iron ore properties in Nevada was announced last month by J. D. McCall, president of Columbia Iron Mining Co., a subsidiary of United States Steel, as part of a continuing long-range raw materials requirements program for steel-making.

Negotiations were completed and deeds have been recorded at Fallon for the transfer of holdings of Mineral Materials Co. of Alhambra, Calif., and American Exploration & Mining Co. of San Francisco. The properties are located in the Mineral Basin Area of Pershing and Churchill Counties, southeast of Lovelock.

These properties provide a new reserve of iron ore to supplement existing sources in meeting future needs for the Western steelmaking furnaces of U.S. Steel's Columbia-Geneva Division.

## West Coast Telephone To Spend \$12,500,000

EVERETT, WASH. — The West Coast Telephone Co. has budgeted nearly \$12,500,000 for telephone construction and improvements in its three-state system during the current year, according to L. Gray Beck, vice president and general manager.

Beck said that nearly half of the amount will be spent in the State of Washington, with the balance to go to company exchanges in Oregon and northern California.

## Gladding, McBean Adding To Salt Lake Facilities

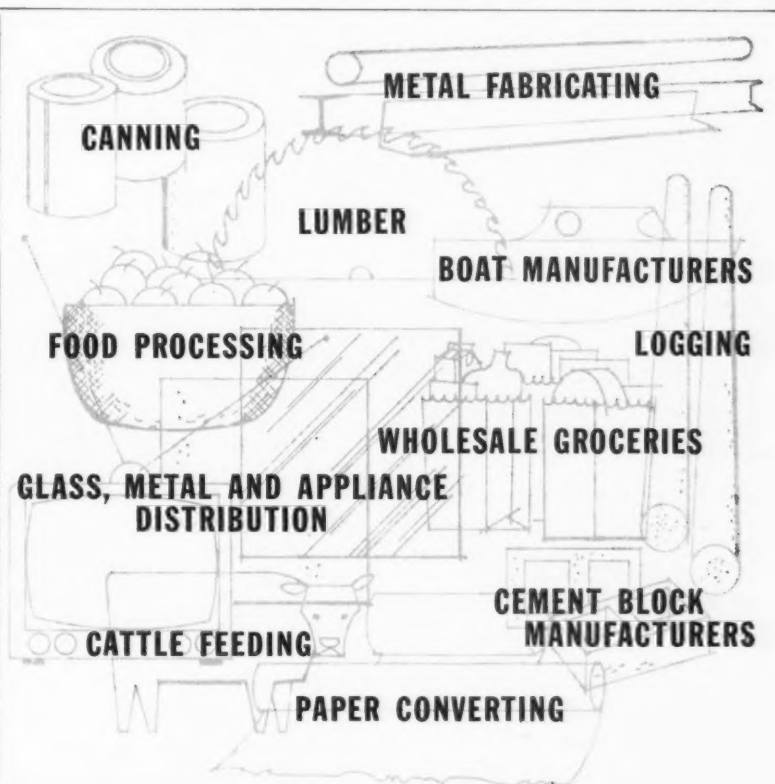
SALT LAKE CITY—A new 2,000-sq.-ft. office building, also a warehouse, will be built at 1075 S. 2nd West adjacent to existing properties of Gladding, McBean & Co., manufacturer of ceramics.

Albert A. Eck, regional manager here for the firm said the office building, in its construction, will feature many of the firm's ceramic architectural products.

## Award Contracts for New McQuay Western Facility

VISALIA, CALIF.—Contracts for building the new West Coast manufacturing plant for McQuay, Inc., here, are being let, and the appointment of Harold T. Hunt as plant manager was announced recently by B. E. James, president of the company which has headquarters at Minneapolis, Minn.

The company manufactures air conditioning, heating, refrigeration and ice making equipment.



Inventories in these and many other Western industries have been used by businessmen to provide adequate working capital or to finance expansion. Haslett Field Warehousing... a Western business... has worked with them for

over 60 years, providing expert knowledge and the finest field warehousing service. If your capital is tied up in inventory, investigate Field Warehousing through your banker or write direct to Haslett today

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# Contract News for the West

Bay Area firms received \$2,446,576 in new Army Ordnance contracts for national defense supplies and services according to a Feb. 6 announcement by Col. William F. Meany, commanding officer of the San Francisco Ordnance District. The contracts include:

*Food Machinery & Chemical Corp.*, San Jose, Calif., \$1,744,506 for additional parts for personnel carriers.

*Aerojet-General Corp.*, Sacramento, Calif., \$545,172, for additional HAWK anti-aircraft missile motors.

*Amplex Data Products Co.*, Redwood City, Calif., \$87,900 for two seven-channel tape recorder-reproducers for wideband telemetry data recording.

*Stanford Research Institute*, Menlo Park, Calif., \$37,520 for more basic chemical engineering research to extend elasticity of silicones into high temperature ranges.

*Hewlett-Packard Co.*, Palo Alto, Calif., \$14,107 for analyzers and pulse generators used in calibration work.

*Aerojet-General Nucleonics*, San Ramon, Calif., \$13,367 to prepare safety codes for a proposed pulsed nuclear reactor.

*Riley Precision Tool Co.*, Redwood City, \$4,004 for lathe chucks.

San Francisco Ordnance District awarded Pacific Car and Foundry Co., Renton, Wash., a \$531,792 contract to complete engineering and inspection details and pilot models of a new amphibious cargo carrier.

Other contracts reported to WESTERN INDUSTRY during February include:

*Garrett Corp.*, Los Angeles, \$18,000,000 for environmental equipment and central air data systems to be installed on versions of the Lockheed F-104 Starfighter ordered by Germany, Belgium, the Netherlands, Canada, Japan and Italy.

*Aerojet-General Corp.*, Avionics Div., Azusa, Calif., approximately \$12,000,000 from Lockheed Missiles and Space Div. for additional research and development work on the Air Force MIDAS infrared sub-system.

*Rohr Aircraft Corp.*, Chula Vista, Calif., more than \$9,000,000 follow-on orders for aircraft components from Boeing, Lockheed and McDonnell and approximately \$4,000,000 from North American Aviation, Inc., to design and build tooling for portions of the B-70 Mach 3 Air Force bomber.

*Servomechanisms Inc.*, El Segundo, Calif., \$718,810 follow-on orders from Lockheed Aircraft Corp. for the production of True Airspeed Computers.

*Perkin Electronics Corp.*, El Segundo, \$400,000 for special power supplies for Titan missile ground support equipment.

*Telecomputing Corp.'s Phoenix Engineering & Mfg. Co.* subsidiary, a contract in excess of \$350,000 from Hughes Aircraft Co. to produce components to be used at each end of the new Falcon missile.

*Teller Construction Co.*, Portland, \$319,000 for construction of chemical facilities and related work in existing building 333 in the 300 area of the Hanford Works, Richland, Wash. from the Atomic Energy Commission.

*Electronic Engineering Co. of California*, Santa Ana, more than \$300,000 for electronic data processing equipment from the Sandia Corp., Albuquerque, N. M.

*Fluor Corp., Ltd.*, Los Angeles, \$100,000 from Allis-Chalmers Mfg. Co. to complete the mechanical and structural engineering, materials procurement and construction of a One Megawatt Plasma Jet Test Stand Facility at North American's Los Angeles plant.

*Rocket Power*, div. of Gabriel Co., Mesa, Ariz., \$100,000 for PIMA booster rockets by U.S. Army Electronic Proving Ground at Ft. Huachuca.

*B. F. Goodrich Industrial Products Co.*, Los Angeles, \$20,000 from Navy Propellant Plant at Indian Head, Maryland, for a unique material which insulates against intense heat.

*General Electric Co.*, Santa Barbara, Calif., \$229,686 by the Air Research and Development Command's Air Proving Ground Center at Elgin Air Force Base, Fla., for a continuation of investigations in analyzing the uses of ion-beam projectors.

## CLASSIFIED SECTION

Space is sold as advertisers' inches. All advertisements in this section are 1/8 inch short of contracted space to allow for borders and composition. Rates are \$16.00 a column inch. Copy should be sent in by the 20th of preceding month if proofs are required; by the 25th if no proofs are required.

### FOR SALE

Pangborn liquid blast cleaning machine, type 1-EZ-3, with car, turn table, and standard nozzle. 208 V., single or three phase; 60 cycle; 100 lbs.; 325 grit; airline PSI-100. Practically new, purchased October, 1960. Contact Purchasing Department, Mattel, Inc. 5150 Rosecrans Avenue, Hawthorne, California.

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Mr. P. L. Gillard, Plant Foreman of K. F. Jacobsen & Co., states, "We do not have any noticeable flyash or sulphuric fumes since we have been using Induco, which is about five years now, and I am well pleased with its performance. I have been an engineer for 15 years and I have tried about every additive on the market and I like Induco best."

### THE FUEL SIDE ADDITIVES

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WESTERN INDUSTRY/MARCH 1961

## Huge Plastic Tent Aids Missile Production



Maywood, Calif.—A huge tent made from vinyl-impregnated nylon is used by the Consolidated Western Steel Div., U. S. Steel, to provide a working area that is dust free for assembly of LOX (liquid oxygen) lines for the Atlas missile launcher that the firm is building for Convair Astronautics, San Diego. Air is filtered for particulate matter and impurities as small as 10-millionths of an inch. An airtight prevents deflation of the bag-like structure when workers enter or leave.

### Consolidated Systems Corp. Forms New Div.

MONROVIA, CALIF.—Consolidated Systems Corp. has established a Photo-Optical Div. which will engineer, manufacture, and market military cameras and precision instrumentation optics, including Miltar lenses, according to Kennett W. Patrick, president.

CSC is an associate company of Allis-Chalmers, Bell & Howell, and Consolidated Electrodynamics.

The Photo-Optical Div. will combine two established operations with the systems engineering capabilities of CSC. They are the Military Products Division of Bell & Howell, which has been transferred from Chicago, and Spectron, formerly a department of CEC's Transducer Div.

The new division will be housed in the 16,000-sq. ft. Spectron facility at Monrovia, Calif.

### Jack & Heintz Merges Into the Siegler Corp.

LOS ANGELES — The stockholders of Jack & Heintz, Inc., Cleveland, and the Siegler Corp., here, recently voted approval of a merger.

The merger combines Siegler's capabilities as a manufacturer of military and commercial electronics and aerospace components with those of Jack & Heintz in the missile aviation and industrial fields, forming a company with sales of about \$100,000,000 annually.

### Facilities Expanded by Hamerslag Equipment Co.

SOUTH SAN FRANCISCO—A major expansion of service and shop facilities has been completed by the Hamerslag Equipment Co., here, according to an announcement by J. Platt Hamerslag, Jr., president.

The addition doubles the firm's area for servicing electric battery powered fork lift trucks and other material handling equipment. Hamerslag is the exclusive Northern California representative for Lewis-Shepard products.

### New Southland Electronic Engineering Firm Formed

INGLEWOOD, CALIF.—Ault-Wieler, Inc., a newly organized firm of Southern California electronic engineering representatives has been announced by Charles E. Ault, president, and William E. Wieler, vice president. The firm is the Southern California affiliate of Ault Associates, established in Northern California in 1952.

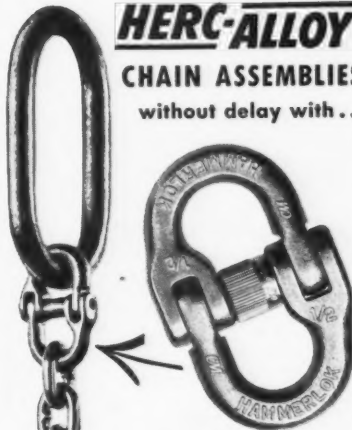
In Southern California, Ault-Wieler will represent Systron-Donner Corp., Concord, Calif., manufacturers of digital instruments and systems; Smith-Florence Inc., Seattle, manufacturers of AC and DC measuring instruments, cable fault finders, and power supplies; and Abtronics Inc., Livermore, Calif., manufacturers of electronic cameras, cathode ray tubes and cathode ray instrumentation.

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Union Carbide



**D. L. Robertson**  
Apex Steel



**J. H. Young**  
Pacific Pumps



**R. D. O'Brien**  
Pacific Car & Foundry



**D. D. Baird**  
B. F. Goodrich



**Geo. Eichelsbach, Jr.**  
McCulloch

■ **Leland Hargraves** has been appointed manager, Arwood Corp.'s Los Angeles plant, and **Fred W. Dischinger**, manager of the LaVerne, Calif., plant.

■ **James B. Strode** has been appointed manager, Hawaiian pipe manufacturing facility, Southern Pipe Div., U. S. Industries, Inc.

■ **L. R. O'Brien** has been named superintendent, Portland plant, Union Carbide Co., replacing retiring **E. L. Hix**.

■ **Durward L. Robertson** has been named executive vice president, Apex Steel Corp., Ltd., Los Angeles.

■ **John H. Young** has been named supervisor sales, steam turbopumps and turbines, Pacific Pumps, Inc., Huntington Park, Calif.

■ **Robert D. O'Brien** has been elected president, Pacific Car and Foundry Co., Seattle, to fill the post of the recently deceased **Paul Pigott**.

■ **David D. Baird** is newly appointed purchasing agent, B. F. Goodrich Co.'s Los Angeles tire and fuel cell manufacturing plant.

■ **George Eichelsbach, Jr.**, vice-president and general manager, Los Angeles Div., McCulloch Corp., has been promoted to vice president of the en-

tire corporation.

■ **A. L. Lisle** has been appointed executive vice president and general manager, Control Dynamics Corp., North Hollywood, Calif.

■ **William H. Reinholdt** has been named chief engineer, Burbank, Calif., Branch, Librascope Div., General Precision, Inc.

■ **Raymond J. Jacklyn** has been appointed manager, new West Coast branch, San Francisco, Big Joe Mfg. Co.

■ **D. B. Miller** is newly named administrative assistant, terminal operations, Pacific Intermountain Express, Oakland, Calif.

■ **Howard E. Rumrey** has been appointed manager, International Div., Soule Steel Co., San Francisco.

■ **Willard F. Bates** has been appointed director manufacturing, new Data Recorders Div., Consolidated Electrodynamics Corp., Pasadena, Calif.

■ **James J. Ambrose** has been named supervisor of safety and training, Bethlehem Steel Co.'s San Francisco yard.

■ **John J. Guth** has been promoted to plant superintendent, Durethane plastic film, Koppers Co., Inc., Los Angeles.

■ **Gilbert F. Roswell** has been elected president, Fairco Industries, Hawthorne, Calif.

■ **Robert Foncell** has been promoted to production manager, Sierra Electronic Div., Philco Corp., Menlo Park, Calif.

■ **John L. Davidson** has been elected president, Coast Envelope Co., Los Angeles.

■ **Joseph T. Noland, Jr.**, has been named sales engineer, Materials Handling Section, Food Machinery & Chemical Corp., Riverside, Calif.

■ **William DeBoer** has been named general traffic manager, Colorado Fuel & Iron Corp.'s Western Div.

■ **Albert H. Allen, Jr.**, is new production manager, MK Diamond Products, Musto-Keenan Co., Los Angeles.

■ **Elbert J. Brandt** has been appointed general manager, Universal Dynamics Div., Acoustica Associates, Inc., Santa Barbara, Calif.

■ **Kenneth F. Williamson** has been appointed vice president and product manager, Grove Valve and Regulator Co., Oakland, Calif.

■ **R. G. Mitchell** has been appointed vice president, sales, Yukon Equipment, Inc., Alaska, with headquarters in Seattle.



■ **Samuel L. Sola** has joined Aeronutronic Div., Ford Motor Co., Newport Beach, Calif., as manager of automotive design, Electronic Equipment Operations.

■ **Harold N. Propp** is newly appointed Western branch manager, San Francisco office, Mining, Crushing and Process Machinery Div., Nordberg Mfg. Co.

■ **Robert W. Dilts** has been promoted to manager, Patent Dept., Eitel-McCullough, Inc., San Carlos, Calif.

■ **Warren W. White** is newly named assistant director, engineering, Robertshaw-Fulton's Aeronautical and Instrument Div., Anaheim, Calif.

■ **Allen J. Hudson** has been appointed secretary-treasurer, Eastman Pacific Co., Los Angeles.

■ **R. Bruce Large** is newly named executive vice president and general manager, Networks, Electronic Corp., Van Nuys, Calif.

■ **John A. Lauger** has been appointed general manager, Foucar, Ray & Simon, San Francisco.

■ **Liston Noble, Jr.**, has been named Oregon sales representative, Stanley Steel Strapping, div. Stanley Works.

■ **George A. Dauphinais** of Atherton, Calif., has been elected vice president and assistant to the president of Electric Autolite Co., Toledo, Ohio.

■ **William Draganchuk** has been named product manager, Temptron, Inc., Reseda, Calif.

■ **Raymond E. Jones** has been promoted to vice president, sales, Matthews Corp., Hawthorne, Calif.

■ **Vernon G. Price** has been appointed manager, Filter and R-F Component Engineering, General Electric's Power Tube Dept. plant, Palo Alto, Calif.

■ **Dunstan S. Gross** is newly named vice president product planning and **Leland P. Robinson, Jr.**, vice president research and development, Friden, Inc., San Leandro, Calif.

■ **Jack D. Wilson** has been appointed manufacturing manager, Santa Barbara, Calif., Research Center, Hughes Aircraft Co.

■ **Ralph E. Brandt**, assistant general freight agent, Santa Fe Railway, San Francisco, is retiring.

■ **Dr. Seymour Siegel** has been appointed to the technical staff, Dynamic Science Corp., South Pasadena, Calif.

■ **Dr. Henry M. Clanton** and **Arvid G. Wedin** have joined the engineering management staff of Marquardt Corp.'s Pomona, Calif., Div.

■ **James Martin** has joined the field engineering staff of Whittaker Controls Div., Telecomputing Corp., Los Angeles.

■ **Dr. Rudolph G. E. Hutter** is new chief engineer, Microwave Device Operations, Electronic Tube Div.,sylvania Electric Products Inc., Mountain View, Calif.

■ **Norman M. Scofield**, Los Altos, Calif., has been named manager, Line Construction, Pacific Gas & Electric Co.

■ **John A. McCone** has been elected a director of Standard Oil Co. of Calif., San Francisco.

■ **Fred R. Burr** has been appointed senior quality control engineer, EMP Electronics, Phoenix.

■ **Donald G. Knox**, has retired after 24 years service with National Supply Div., Armco Steel Corp., Torrance, Calif.

■ **Burl H. Ervin** has been appointed director of applications engineering, Systems Support Dept., Nortronics, a div. of Northrop Corp., Anaheim, Calif.

■ **R. L. Armstrong** is new manager, Rocky Mountain Area, Oil Well Supply Div., U.S. Steel Corp. now headquartered at Denver.

■ **Dr. Wang Mo Wong** has joined the pilot plant research staff, U.S. Borax Research Corp., Boron, Calif.

■ **William P. Pierce** has been appointed assistant general traffic manager, Kaiser Steel Corp., Oakland, Calif.

■ **Clarence D. Martin, Jr.**, Los Angeles businessman, has been appointed Under Secretary of Commerce for Transportation by President Kennedy.

■ **William D. Owens** has been appointed general manager, Heiland Div., Minneapolis-Honeywell Regulator Co., Denver.

■ **Oscar M. Hendrickson** has been elected president, Los Angeles-Seattle Motor Express, Inc., Seattle.

■ **A. F. McAlister**, electrical design engineer, has joined the staff of Rundel Electric Co., Millbrae, Calif.

■ **Egil Hoyer**, research and development engineer, has joined the staff of Clyde E. Wolters, San Francisco.

■ **Albert P. Albrecht** has been elected vice president and general manager, Space Electronics Div., Space Electronics Corp., Glendale, Calif.

■ **Stanley Ross**, president of California Investors, Inc., has been elected a director of Epps Industries, Inc., Los Angeles.

■ **W. N. Mobley** has been appointed manager, manufacturing, General Electric's Fuels Preparation Dept., Hanford, Wash.

■ **Francis C. Bennett** is retiring as superintendent of Colorado Fuel & Iron Corp.'s Frederick coal mine, Valdez, Colo.

■ **Charles Souliard** has been promoted to district service manager, Denver, Western area, Motorola Communications and Electronics, Inc.

■ **Leonard C. Matson**, La Habra, Calif., controller and treasurer, Western States Lacquer Corp., passed away recently.

■ **Robert L. Burns**, Whittier, Calif., has been named controller Jessop Steel of California, Santa Fe Springs, Calif.

■ **R. S. Bowditch** has been appointed chief engineer, Electronics Div., Statham Instruments, Inc., Los Angeles.

■ **Erwin Tomash** has been elected vice president Ampex Corp. and manager, Ampex Computer Products Co., located at Culver City, Calif.

■ **Raymond S. Fries** has been named general manager, Ground Support Div., American Electronics, Inc., Los Angeles.

■ **Fred J. Gust** has been named manager, Longview Retail Yard of International Paper Co.'s Long-Bell Div., Longview, Wash.

■ **Edgar M. Shurtleff** has been named director, research and development, Special Devices, Inc., Pacoima, Calif.

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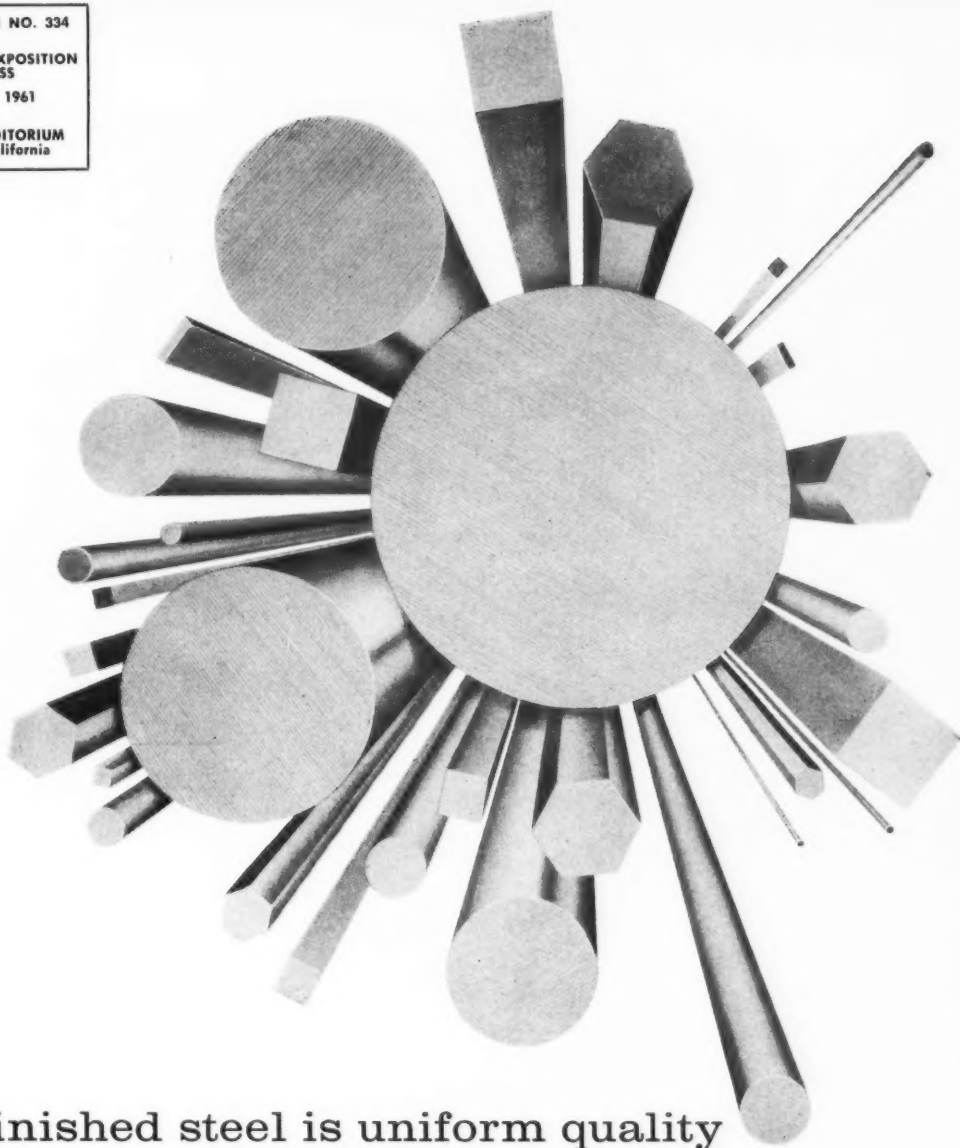
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